Final

Phase I RFI/RI
Technical Memorandum Number 1

Rocky Flats Plant
Inside Building Closures
(Operable Unit 15)

U S Department of Energy
Rocky Flats Plant
Golden, Colorado

Environmental Restoration Program

May 1994

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LIST OF ACRONYMS

BRA	Baseline Risk Assessment
BU	building sample
CDH	Colorado Department of Health
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CRQL	Contract Required Quantitation Limit
D&D	Decontamination and Decommissioning
DEHP	bis(2-ethylhexyl)phthalate
DOE	United States Department of Energy
DQO	Data Quality Objective
EB	Electron Beam
EG&G	EG&G Rocky Flats, Inc
EMRG	Environmental Management Radiological Guidelines
EPA	United States Environmental Protection Agency
FSP	Field Sampling Plan
GENII	Hanford Environmental Dosimetry System (Generation II)
GRRASP	General Radiochemistry and Routine Analytical Services Protocol
IAG	Interagency Agreement
ICRP	International Commission on Radiological Protection
IHSS	Individual Hazardous Substance Site
MDA	minimum detectable activity
MS	matrix spike
MSD	matrix spike duplicate
NFA	No Further Action
NRC	Nuclear Regulatory Commission
OU	operable unit
PARCC	precision, accuracy, representativeness, completeness and comparibility
QAPjP	Quality Assurance Project Plan
QA/QC	quality assurance/quality control
RCA	Radiologically Controlled Area
RCRA	Resource Conservation and Recovery Act
RFEDS	Rocky Flats Environmental Database System
RFI	RCRA Facility Investigation
RFP	Rocky Flats Plant
RI	remedial investigation
ROI	Radiological Operating Instruction
RPD	relative percent difference

RPT	Radiation Protection Technologist
SOP	Standard Operating Procedure
TAL	Target Analyte List
TC	Toxicity Characteristic
TCL	Target Compound List
TM#1	Technical Memorandum Number 1
TM#2	Technical Memorandum Number 2
VOC	volatile organic compound

LIST OF DATA TABLE FIELD DESCRIPTIONS

IHSS	IHSS that sample was collected at or associated with
Sample Number	The sample identifier
QC Code	Quality control sample information provided by the field
QC Partner	The sample number associated with a QC sample's REAL sample is entered here If the sample is REAL then this column is left blank
Sample Date	The date the sample was collected
Test Group	Also referred to as the method code This is a RFEDS code for the method used to analyze a group of samples
Result Type	RFEDS codes that differentiate between target analytical results, laboratory quality assurance samples, and laboratory reanalysis This field specifically distinguishes the multiple analytical attempts when more than one analysis attempt was necessary or requested
Compound/Radionuclide	The analyzed compound/radionuclide name
Result	Concentration numeric value
Error	The counting error The error is a measure of the variability of the instrument reading during sample counting Error data is provided for radionuclide analyses only
Qualifier	A code which indicates qualifications or limitations to the reported result
Detection Limit	The detection limit specified for the analysis type as required in the GRASP For diluted samples, the detection limit is corrected for the dilution factor
Validation Code	Validation code for the result

LIST OF OU15 QC CODE DESCRIPTIONS

QC CODE	DESCRIPTION
DUP	Duplicate sample taken in the field
FB	Field blank (source water sample)
REAL	Real sample
RNS	Equipment rinsate blank following decontamination
TB	Trip blank

LIST OF OU15 TEST GROUP DESCRIPTIONS

TEST GROUP	DESCRIPTION
BNACLP	Semi-volatile organic compounds
DMETADD	Dissolved metals (additional list)
DSMETCLP	Dissolved metals (CLP list)
DRADS	Dissolved radionuclides
VOACLP	Volatile organic compounds
WQPL	Water quality parameters (cyanide)

LIST OF OU15 RESULT TYPE DESCRIPTIONS

RESULT TYPE	DESCRIPTION
DIL	Dilution
DL1	Dilution
REP	Replicate
TRG	Target

LIST OF REFERENCES

EG&G, 1991: EG&G Rocky Flats, Inc , "General Radiochemistry and Routine Analytical Services Protocol (GRRASP)," Golden, Colorado, 1991

EPA, 1988: Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion, Federal Guidance Report No 11, EPA-520/1-88-020

EPA, 1989: United States Environmental Protection Agency, "Risk Assessment Guidance for Superfund Volume I, Human Health Evaluation Manual (Part A)," Interim Final, Washington, D C , EPA, Office of Emergency and Remedial Response, EPA/540/1-89/002, 1989

EPA, 1993: External Exposure to Radionuclides in Air, Water, and Soil Federal Guidance Report No 12, EPA-402-R-93-081

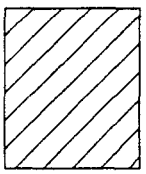
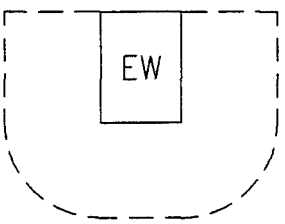
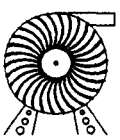
Hawley, 1985: J K Hawley, "Assessment of Health Risk from Exposure to Contaminated Soil," Risk Analysis, Vol 5, No 4, pp 289-302, 1985

Napier, et. al., 1988: B A Napier, R A Peloquin, D L Strenge, and J V Ramsdell, "GENII - The Hanford Environmental Radiation Dosimetry Software System, Volumes 1 through 3," Pacific Northwest Laboratory, PNL-6584, 1988

NRC, 1990: Nuclear Regulatory Commission, "Residual Radioactive Contamination From Decommissioning," Draft, Washington, D C , Division of Regulatory Applications, Office of Nuclear Regulatory Commission, NUREG/CR-5512, PNL-7212, 1990

NRC, 1993: Nuclear Regulatory Commission, "Residual Radioactive Contamination From Decommissioning," Final, Washington, D C , Division of Regulatory Applications, Office of Nuclear Regulatory Commission, NUREG/CR-5512, PNL-7212, 1993

DRAWING LEGEND

1	SMEAR SAMPLE/FINAL RADIOLOGICAL SURVEY LOCATION
1	SMEAR SAMPLE/FINAL RADIOLOGICAL SURVEY NUMBER
BU00050ER 4472046	HOT WATER RINSATE SAMPLE LOCATION
BU00050ER	HOT WATER RINSATE SAMPLE NUMBER
4472046	HOT WATER RINSATE SAMPLE LOCATION CODE
	IHSS LOCATION
———	ROOM/EQUIPMENT BOUNDARY
CL	COLUMN
	DOOR
- - - - -	OBSTRUCTED SPACE BOUNDARY
	EYE WASH
	PUMP
	HEATING ELEMENT

ABBREVIATIONS

ACT	ACTIVATED
BLDG	BUILDING
DIA	DIAMETER
EB	ELECTRON BEAM
HEPA	HIGH EFFICIENCY PARTICULATE AIR
NO	NUMBER
RAD	RADIOLOGICAL
VAC	VOLTS–ALTERNATING CURRENT

KEYWORDS	A	ORIGINAL ISSUE			XX/XX/93	RCH	KAS	PRB	DLS						
1 OU15	ISSUE	DESCRIPTION			DATE	RFP				DOE	CLASS	JOB NO			
2 PHASE I					U S DEPARTMENT OF ENERGY ROCKY FLATS AREA OFFICE GOLDEN COLORADO										
3 RFI/RI		DESIGNED	HEA	XX/XX/93											
4 TECH MEMO		DRAWN	SCHACKLIN	12/21/93	Rocky Flats Plant GOLDEN COLORADO 80401										
5 NUMBER 1		CHECKED	BIERBAUM	XX/XX/93											
BLDG./FACILITY SITE		APPROVED	SCHUBBE	XX/XX/93	OU15 PHASE I RFI/RI										
ROOM/AREA GEN					DRAWING LEGEND AND ABBREVIATIONS										
GRID COOR./COL NO.		SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER					ISSUE	FIGURE			
MASTER YES ☐ NO ☒	SCALE NONE	APPROVED RFP			B						A	TOC-1			
		APPROVED DOE													

SITE
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Section 1.0

1.0 INTRODUCTION

This document, Technical Memorandum Number 1 (TM#1), supports the Operable Unit 15 (OU15) Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) activities at the Rocky Flats Plant (RFP) as outlined in the Final Phase I RFI/RI Work Plan for OU15 (the Work Plan) Technical memoranda are required to describe the field sampling activities and the Baseline Risk Assessment (BRA) in accordance with the following documents

- RFP Interagency Agreement (IAG) (January 22, 1991) between the United States Department of Energy (DOE), the United States Environmental Protection Agency (EPA), and the State of Colorado Department of Health (CDH), and
- Final Phase I RFI/RI Work Plan for RFP Operable Unit 15 - Inside Building Closures (March 23, 1993)

TM#1 describes the implementation of the Work Plan Field Sampling Plan (FSP) and provides the results of completed sampling activities If necessary, a Baseline Risk Assessment (BRA) will be performed and documented in Technical Memorandum #2 (TM #2) This document does not address the BRA The OU15 Phase I RFI/RI Report will be based on TM#1 and, if required, TM#2

1.1 Objectives

Sections 4 1 of the Work Plan provides the overall objectives of the OU15 Phase I RFI/RI The Work Plan provides a technically adequate basis for characterization of indoor contamination at the Individual Hazardous Substance Sites (IHSSs) which compose OU15 Its general purpose is to

1 Characterize the nature and extent of contamination associated with the OU15 IHSSs

2 Determine whether releases have occurred from any of the OU15 IHSSs

3 Support the BRA and closure activities

4 Determine the need for additional investigation (Stage III - outdoor)

In complying with the requirements of the IAG as they apply to OU15, both RCRA and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) concerns must be addressed In the case of OU15, the two environmental acts have defined objectives in terms of the specific evaluations to be performed in the Phase I RFI/RI Specifically

1 The RCRA regulations apply to the closure of RCRA-regulated units within OU15 and address only RCRA-regulated constituents that have been released or are located within the unit boundaries The RCRA closure performance standards are addressed in the Work Plan and are defined in the RFP State RCRA Permit

2 CERCLA requirements specify that the remediation of an operable unit be performed in such a manner as to be protective of human health and the environment In the case of RCRA-regulated units, the CERCLA requirements are satisfied through application of the RCRA closure performance standards to each IHSS for RCRA-regulated constituents, because the RCRA closure performance standards are more stringent than the general protectiveness standards of CERCLA Therefore, the CERCLA evaluation for OU15 is restricted to determining protectiveness as it relates to the radionuclides present at IHSSs within OU15

This document presents the methods and results associated with the OU15 Stage I and II field investigations It provides the decision basis for recommending whether additional outdoor investigation should be performed and for determining whether additional indoor investigation (i e , verification sampling) is required to show that the IHSSs meet the clean closure performance standards defined in the Work Plan For each

IHSS, the decision regarding the need for Stage III investigation is based on an evaluation of release potential and mechanisms, and on historical use and release reports which indicate whether any releases are known to have occurred Clean closure status for each IHSS is determined by comparing organic and inorganic contaminant concentrations to levels established in the RFP State RCRA Permit The evaluation of radiological constituents is based on comparing the dose associated with those constituents to the standards specified in the Work Plan

To maintain contact with the various parties involved and ensure concurrence on technical issues as the project proceeds, TM#1 will be prepared and submitted to EPA and CDH prior to the submission of the Draft Phase I RFI/RI Report for OU15 Following approval by EPA and CDH, TM#1 will form the basis for the Draft Phase I RFI/RI Report, therefore, early concurrence on the technical issues addressed here will minimize the report comment and revision cycle

1.2 Requirements of the Interagency Agreement (IAG)

In accordance with the IAG, the OU15 Phase I RFI/RI includes IHSSs 178, 179, 180, 204, 211, and 217 OU15 originally comprised of eight IHSSs, however, IHSSs 212 and 215 are no longer included as part of this investigation The closure of IHSS 212 is now addressed in Part VIII of the RFP RCRA Mixed Residue Permit Modification If any corrective action under CERCLA is necessary, the work will be performed pursuant to the IAG, including the issuance of a decision document to close the unit IHSS 215 was transferred to Operable Unit 9 (OU9) in a Modification to Work of the IAG dated April 21, 1992, and has already been included in the Phase I RFI/RI for OU9

The Final Phase I RFI/RI Work Plan (dated March 23, 1993) was approved for OU15 in accordance with the IAG Following completion of the work, the Draft Phase I RFI/RI Report must be submitted by the IAG milestone date of August 1, 1994 The

Draft Phase I RFI/RI Report must contain a Preliminary Site Characterization Summary describing the OU, and the nature and extent of contamination with data sufficient to support a BRA for OU15, if one is required The Draft Report must also contain the BRA and an identification of any releases from OU15 (or IHSSs within OU15) and any areas which may have been impacted by such releases The Final Phase I RFI/RI Report must be submitted by the IAG milestone date of January 4, 1995 If it is determined that no additional investigation is required at OU15, the Final Phase I RFI/RI Report for OU15 will become the Final RFI/RI Report Otherwise, a second phase of investigation will be initiated

In accordance with Section I B II a of the IAG, additional action at an IHSS within OU15 may be required if

1 There has been a release of hazardous constituents or hazardous substances to the environment external to the IHSS, or

2 There is a threat of post-closure escape of hazardous waste, hazardous constituents, leachates, run-off, hazardous waste decomposition products, or hazardous substances

If there has been no releases and there is no threat of release at an IHSS, then further action will not be required

Prior to submission of the Draft Phase I RFI/RI Report, the IAG requires that DOE submit to EPA and CDH a series of four technical memoranda describing the BRA, including

1 Contaminant Identification and Documentation,
2 Exposure Assessment and Documentation,
3 Toxicity Assessment and Documentation, and
4 Risk Characterization

This document (TM#1) fulfills the Work Plan requirement of submittal of an FSP Technical Memorandum describing the field sampling activities and results

1.3 Scope of Work

The scope of work for the Phase I RFI/RI at OU15 was approved in the Final Phase I RFI/RI Work Plan, dated March 23, 1993 This section briefly describes the key work elements contained in the Work Plan

Sampling and inspection activities were conducted from April 23, 1993 to November 9, 1993 for Stage I and II of the OU15 Phase I RFI/RI at the following IHSSs

IHSS 178	Building 881, Drum Storage Area (Room 165)
IHSS 179	Building 865, Drum Storage Area (Room 145)
IHSS 180	Building 883, Drum Storage Area (Room 104)
IHSS 204	Building 447, Unit 45, Original Uranium Chip Roaster (Rooms 32 and 502)
IHSS 211	Building 881, Unit 26, Drum Storage Area (Room 266B)
IHSS 217	Building 881, Unit 32, Cyanide Bench Scale Treatment (Room 131C)

The Phase I RFI/RI investigation included surface sampling for chemical and radiological contamination in each of the above IHSSs, but did not include collection of any samples of environmental media (soil, air, water) Analytical parameters were selected for each IHSS based on its previous uses, and included volatile and semi-volatile organic compounds, metals, cyanide, and radionuclides

Samples were collected from surfaces (i e , floors and structures) within each IHSS as well as from areas defined as "perimeter" and "pathway" areas Perimeter and pathway areas were selected to determine whether contamination from within an IHSS has migrated out of the IHSS The data collected at each sampling location included hot water rinsate samples, beryllium and radiological smear samples, and fixed radiation surveys

The details of the scope of work for the OU15 Phase I RFI/RI are presented in the Work Plan and are summarized in Section 3 0 of this document

1 4 Report Organization

Section 2 0 of this document summarizes the historical information available for each IHSS and presents the results of the visual inspections for each IHSS Section 3 0 describes the methods used to collect the Stage I and II samples Section 4 0 discusses the OU15 Phase I RFI/RI data quality objectives and compares the Stage I and II sampling results to these objectives Section 5 0 presents the Stage I and II organic and inorganic analytical data and compares them to the RCRA closure performance standards Section 6 0 presents the Stage I and II radiological data and evaluates them with respect to CERCLA requirements Section 7 0 summarizes the results of the RCRA and CERCLA evaluations for each IHSS Finally, Section 8 0 contains the schedule for performing additional OU15 activities

In addition to this Technical Memorandum, the analytical database for the project is being transmitted under the same cover on diskette

Section 2.0

2.0 *HISTORICAL INFORMATION AND VISUAL INSPECTIONS*

This section summarizes the historical use and presents the visual inspection findings for each of the six IHSSs which compose OU15 Visual inspections of each IHSS were completed before sampling activities began Drawings of each IHSS were developed from measurements taken during the visual inspections A legend describing the symbols and abbreviations used on the IHSS drawings is provided in the Table of Contents

Visual inspections were performed to assess the configuration of the units, to identify the presence and condition of berms or other secondary containment systems, and to document the conditions of the floors The floors were inspected for slopes, cracks, and/or worn areas that might represent contaminant migration pathways and the presence of any sumps or drains Visual inspections were performed at each IHSS prior to sampling activities

Additional research on the historical uses of and releases from each IHSS was completed as part of the Stage I and II field investigations The research consisted of document and database reviews and interviews with RFP building personnel The documents and database reviewed included the Draft and Final "Historical Release Reports" for the Rocky Flats Plant, the "Task 3/4 Draft Report Rocky Flats History," and the EG&G Spill/Release Database

2.1 *IHSS 178*

IHSS 178 is a drum storage area located in Room 165 of Building 881 (Figure 2-1) The following subsections summarize the historical use of the IHSS as documented in the Work Plan, present additional historical information, and describe the findings from the visual inspection of IHSS 178

2.1.1 Historical Use of IHSS 178

IHSS 178 is a drum storage area located within Room 165 on the first floor of Building 881 There is no basement beneath Room 165 The drum storage area was first used in 1953 when Building 881 operations began Currently IHSS 178 is used as a RCRA 90-day accumulation area

The drums stored at this IHSS contained wastes generated within Building 881 Analytical results for wastes from Building 881 typical of those stored in IHSS 178 are presented in the Work Plan These drums contained volatile organic compounds (VOCs) (Freon TF and 1,1,1-trichloroethane), carbon dioxide and possibly low-level radioactive wastes

Routine visual monitoring for spills and/or releases was conducted during the period of operation of this storage unit However, the visual monitoring frequency is not presently known As part of the development of the closure plan for this unit, a site visit was performed during November 1986 At that time, there was no visual evidence or documentation of any spills or releases in the storage unit Five 55-gallon drums were stored at this IHSS in November 1986

2.1.2 Additional Historical Information for IHSS 178

According to the Final Historical Release Report, "no documentation was found that indicates a release to the environment " During a site visit on April 28, 1994, no hazardous waste was being accumulated in the area RFP building personnel indicated that no hazardous waste had been accumulated in the room for some time (timeframe not specified) A review of inspection logs which dated from March 1, 1989 through April 27, 1993 revealed no information documenting or alluding to any spills or releases of hazardous wastes or constituents

2.1.3 *Visual Inspection of IHSS 178*

As part of the OU15 Phase I RFI/RI, the site was visited on April 23, 1993 to visually observe the condition of IHSS 178 At the time of the visit, no drums were stored in the IHSS The IHSS is located in Room 165 of Building 881, on the floor adjacent to the access door for the building plenum in Room 164 The IHSS was demarcated by two painted circles, each approximately four feet in diameter, that straddle a building column At the time of the inspection, there were no access restrictions to the IHSS itself

A maximum of five 55-gallon drums could be stored in the IHSS at one time There were no secondary containment berms present around the IHSS or at the doors, and no discernable slope was noted for the floor With the exception of the IHSS circles, the majority of the concrete floor in Room 165 was not painted The unpainted concrete did have a finishing coat and was in good condition

2.2 *IHSS 179*

IHSS 179 is a drum storage area located in Room 145 of Building 865 (Figure 2-2) The following subsections summarize the historical use of the IHSS as documented in the Work Plan, present additional historical information, and describe the findings from the visual inspection of IHSS 179

2.2.1 *Historical Use of IHSS 179*

IHSS 179 is a drum storage area located in the north end of Room 145, which is situated on the ground floor in the center of Building 865 Drum storage in IHSS 179 began in 1970 By November 1986, IHSS 179 was being used as a RCRA 90-day accumulation area The maximum inventory stored in the IHSS at any one time was ten 55-gallon

drums The drums stored in IHSS 179 were placed directly on the concrete floor No containment berms were present immediately adjacent to the IHSS

Samples were obtained from drums stored in IHSS 179 during May and July 1986, and analyzed for total alpha, beryllium, and select organic compounds Total alpha, beryllium, and certain organic compounds were detected in one or both of the drums sampled The results of the analyses are presented in the Work Plan

During a site visit in November 1986, two drums were being stored in the IHSS The drums contained oils, chlorinated solvents, radioactive waste, and possibly beryllium Shortly thereafter, the use of chlorinated solvents was eliminated in the area where the wastes stored in IHSS 179 were being generated Consequently, after 1986, it is likely that the waste drums stored in IHSS 179 contained only oil possibly contaminated with beryllium and radioactive waste

The drums stored in IHSS 179 were visually monitored daily for spills and releases There have been no documented releases and based on prior visual inspections, and there was no evidence of spills If any spills from the drums did occur, the spilled material may have collected in the concrete pit underneath the Electron Beam (EB) welder, located north of the IHSS The pit has a sump with an automatic pump operated by a float switch Accumulated liquids would have been transferred via overhead piping and the valve vault system to Building 374 for treatment

2.2.2 Additional Historical Information for IHSS 179

The Final Historical Release Report states, "There have been no documented releases and based on a visual inspection on November of 1986, there was no visual evidence of spills "

The Task 3/4 Draft Report indicates that the following chemicals of concern have been used in Room 145 chromium boride, chromium carbide, chromium silicide, lead powder, nickel, and nitric acid It should be noted that Room 145 is a large process area, and involves many operations not associated with the drum storage area

A report generated from the EG&G Spill/Release Database indicates that approximately 50 gallons of process water was released in Room 145 on April 6, 1990 According to the report, "50 gallons of Process Waste was released to the Mezzanine and floor of Room 145 after a pipe union broke Samples were taken for analysis, and the spill was vacuumed up and returned to the Process Waste system by 0930 "

2.2.3 Visual Inspection of IHSS 179

As part of the OU15 Phase I RFI/RI, the site was visited on April 23, 1993 to visually observe the condition of IHSS 179 At the time of the visit, no drums were stored in the IHSS The IHSS was located, in Building 865, on the floor of Room 145 in front of a large electrical panel, and was painted to mark its location Its dimensions were approximately 8 feet by 12 feet Markings were also present to identify the access requirements for the electrical panel At the time of the inspection, there were no access restrictions to the IHSS itself, other than those associated with the Radiologically Controlled Area (RCA) in which it is located

There were no secondary containment berms present around the IHSS The floor sloped north towards a concrete pit in the floor under the EB welder The concrete floor in the IHSS and surrounding area was painted and was in good condition

2.3 *IHSS 180*

IHSS 180 is a drum storage area located in Room 104 of Building 883 (Figure 2-3) The following subsections summarize the historical use of the IHSS as documented in the Work Plan, present additional historical information, and describe the findings from the visual inspection of IHSS 180

2.3.1 *Historical Use of IHSS 180*

IHSS 180 is a drum storage area located within Room 104 of Building 883 Room 104 was added on to the east side of the original building and was built on a grade The area was first used as a container storage area in 1981 and has been used as a 90-day accumulation area for RCRA-regulated wastes for part of its operational history

The storage area within Room 104 measures 10 feet by 16 feet The unit stored a maximum of thirty 55-gallon drums, which were placed directly on the floor There are no containment berms around the drums and no drains in the floor

Samples from drums stored in the area were obtained on five separate dates and analyzed for total alpha, beryllium, and "general components " The results of the analyses are presented in the Work Plan As indicated by the analytical results, VOCs, beryllium, and radioactivity were present in the drums sampled The wastes included oils contaminated with organic compounds and uranium Visual monitoring of the storage area was conducted periodically, but the frequency is not presently known No documentation indicating a release from drums stored at this IHSS was found

2.3.2 Additional Historical Information for IHSS 180

According to the Final Historical Release Report, "There have been no documented releases and, based on a visual inspection on November of 1986, there was no visual evidence of spills or leakage " No additional information on the wastes stored in the IHSS was found

2.3.3 Visual Inspection of IHSS 180

As part of the OU15 Phase I RFI/RI, the site was visited on April 23, 1993 to visually observe the condition of IHSS 180 At the time of the visit, no drums were stored in the IHSS, but the unit was designated for storage of low-level radioactive waste (non-hazardous) The IHSS was located on the floor of Room 104 in Building 883, and was painted to mark its location At the time of the inspection there were no access restrictions to the IHSS itself, other than those associated with the RCA in which it is located

There were no secondary containment berms present around the IHSS or at the dock door leading from Room 104 to the outside of the building The floor sloped from the IHSS toward the weigh scale, which was housed in a concrete pit recessed in the floor, and not toward the dock door The concrete floor in the IHSS and surrounding area was painted, but was scuffed and in poor condition

2.4 IHSS 204

IHSS 204 (also known as RCRA Unit 45) is the Original Uranium Chip Roaster located in Rooms 32 and 502 in Building 447 (Figures 2-4 and 2-5) Access to the unit is provided by Rooms 31 and 501 An equipment wash rack/drum washing basin associated with the Original Uranium Chip Roaster is located in Room 501 (Figure 2-6) The

following subsections summarize the historical use of the IHSS as documented in the Work Plan, present additional historical information, and describe the findings from the visual inspection of IHSS 204

2.4.1 Historical Use of IHSS 204

The Original Uranium Chip Roaster is located in Rooms 32 and 502 of Building 447, and is constructed of mild steel casing lined with alumina refractory brick It is cylindrical with a diameter of 5 feet 6 inches and a height of 7 feet 4 inches The unit was identified as Unit 45 in the 1986 RCRA Part B permit application

The unit oxidizes elemental uranium to uranium oxide Depleted uranium chips originated from the Building 444 production area and were historically coated with small amounts of oils and coolants (Freon TF and 1,1,1-trichloroethane) Chips were stored in 55-gallon drums and transferred to Building 447 for roasting Currently, the Original Uranium Chip Roaster is still operational, however, the uranium chips are no longer coated with oils or coolants that are RCRA-regulated hazardous wastes

Before roasting, the chips were rinsed with hot water to remove excess coatings The rinsate was disposed of in the building process drain The chips were fed into the top of the roaster at a rate of approximately three 55-gallon drums per day The chips ignited upon entry and sustained self-combustion throughout the roasting cycle When the roasting cycle was complete, the uranium oxide was removed through a hole in the bottom of the unit and was collected in 30-gallon drums

An incident involving the roaster occurred in Room 32 of Building 447 on June 28, 1985 The ignition of some cardboard in the room set off the sprinklers and fire alarm, and flooded the basement of the building A second incident, indirectly related to this IHSS occurred on July 20, 1986 During a major rain event, a main 36-inch storm

sewer/drainage system collapsed and flooded portions of Buildings 444 and 447 In Building 447, several inches of water accumulated throughout the process areas The basement, including Room 32, was flooded with several feet of water

2.4.2 Additional Historical Information for IHSS 204

The Final Historical Release Report states, "Because of the operating temperatures of the roaster and the chemical and physical properties of freon TF and 1,1,1-trichloroethane, it is not expected that any residual material remains in this unit " RFP building personnel indicated that there have been no spills or releases associated with this unit during their tenure with the building over the last 15 years They added that no hazardous constituents (e g , solvents) have been used in association with the unit since January of 1988

2.4.3 Visual Inspection of IHSS 204

As part of the OU15 Phase I RFI/RI, the site was visited on April 23, 1993 to visually observe the condition of IHSS 204 At the time of the visit, approximately twelve drums were stored in Room 32, and six drums were stored in Room 502 Miscellaneous equipment including ladders and drum dollies were also present in both rooms No drums or equipment were present in the Wash Rack/Drum Washing Basin, which is located in Room 501 The Original Uranium Chip Roaster spans two floors The chip inlet is located upstairs in Room 502, and the main body of the roaster, including the oxide outlet ports, is located in Room 32, directly beneath Room 502 At the time of the inspection there were no access restrictions in Rooms 31 and 501, other than those associated with the RCA in which they are located However, entry into Room 32 required use of Anti-C clothing, and entry into Room 502 required use of a full-face respirator

There were no secondary containment berms present around Rooms 32 or 502 No discernable slope was noted for the floors in either room The concrete floor in both rooms was painted and generally in good condition, although black dust was visible on the floors and exterior surfaces of the chip roaster in both rooms The concrete pad and berm of the Wash Rack/Drum Washing Basin was in good condition with no apparent gaps or cracks The floor in the basin sloped to a process drain located in the center of the pad

2.5 IHSS 211

IHSS 211 (also known as RCRA Unit 26) is a drum storage area located in Room 266B of Building 881 (Figure 2-7) The following subsections summarize the historical use of the IHSS as documented in the Work Plan, present additional historical information, and describe the findings from the visual inspection of IHSS 211

2.5.1 Historical Use of IHSS 211

IHSS 211 is a drum storage area located in Room 266B on the second floor annex of Building 881 Since May 16, 1989, IHSS 211 has been operating as a RCRA 90-day accumulation area Prior to this time, the unit was a drum storage area for mixed waste and was included in the hazardous and low-level mixed waste RCRA Part B permit application as Unit 26 The unit was first used as a drum storage area in 1981

The wastes stored in the unit have historically included both liquids and solids generated from the general laboratories in the building The waste streams currently approved for storage in Unit 26 include low-level combustible waste possibly contaminated with

hazardous solvents and/or metals, and metal and glass waste or materials contaminated with hazardous solvents There was no recorded documentation of a spill or release in the unit

2.5.2 Additional Historical Information for IHSS 211

According to the Final Historical Release Report, there is no indication that hazardous waste or constituents have been released in association with this area A review of inspection logs which dated from March 1, 1989 through April 27, 1993 revealed no information documenting or alluding to any spills or releases of hazardous wastes or constituents

The Task 3/4 Draft Report indicates that the following chemicals of concern have been used in Room 266 carbon tetrachloride, chloroform, and nickel catalyst It should be noted that Room 266 is separated from Room 266B by a wall and a sealed doorway The same report indicates that the following chemicals have been used in Building 881 laboratories benzene, beryllium, cadmium and cadmium compounds, carbon tetrachloride, chloroform, chromium and chromium compounds, lead and lead compounds, mercury, methylene chloride, nickel and nickel compounds, nitric acid, tetrachloroethylene, 1,1,1-trichloroethane, and trichloroethylene

A report generated from the EG&G Spill/Release Database indicates that 2 5 gallons of nitrate solution was released in Room 266 on January 21, 1991 According to the report, the "scrubber hose came loose from the pump and sprayed a lab hood and into the ceiling tile The pump was shut off and the leak was stopped " The waste was collected in the waste vacuum cleaner and managed in the waste process drain

2.5.3 Visual Inspection of IHSS 211

As part of the OU15 Phase I RFI/RI, the site was visited on April 23, 1993 to visually observe the condition of IHSS 211 At the time of the visit, there were seven 55-gallon drums located in the IHSS Six of the drums contained solid waste, and one of the drums contained liquid waste and was in a catch pan Access to the IHSS was restricted by a locked cage door

The drum storage area was 10 feet by 20 feet and could store a maximum of twenty-nine 55-gallon drums at one time The floor was constructed of concrete, which was sealed with epoxy paint Drums were stored directly on the floor or in catch pans Weekly container inspections were conducted to visually assess the structural integrity of the drums and to check for leaks and spills

There were no secondary containment berms around the storage area, at the entrance to the IHSS, or under the sealed door at the back of the IHSS The concrete floor, painted with an epoxy coating, was in good condition, however, a sealed crack in the floor approximately one to two inches wide ran the length of the room RFP building personnel were unfamiliar with when the crack had first appeared and how often it had been repaired, but indicated that the crack had most recently been repaired approximately one month prior to the site visit RFP building personnel added that the crack may have originally been narrower, and may have been ground out at the surface to facilitate its repair

Since the building is partially below grade, ground water may leak into Building 881 in the vicinity of Room 266B Room 266B had two catch pans positioned approximately 6 inches under the ceiling to collect potential seepage into the room The catch pans drained to collection bottles on the floor Additional catch pans and collection bottles were located in the hallway outside of the IHSS

2.6 IHSS 217

IHSS 217 is the cyanide bench scale treatment unit (RCRA Unit 32) located in Room 131C of Building 881 (Figure 2-8) The following subsections summarize the historical use of the IHSS as documented in the Work Plan, present additional historical information, and describe the findings from the visual inspection of IHSS 217

2.6.1 Historical Use of IHSS 217

IHSS 217 is a cyanide bench scale treatment process (RCRA Unit 32) located in Room 131C, on the first floor of Building 881 The unit consisted of a 4 feet by 5 feet painted metal fume hood and laboratory table, three 4-liter polyethylene bottles, a glass beaker, and a chlorine-specific ion electrode The laboratory table and metal fume hood were originally installed in 1952 No information was available regarding the operational history of this unit prior to its use for treatment of cyanide The hood appeared to be made of metal covered with a coat of paint The hood had an integral lip across the front which provided containment of any wastes spilled within the hood

The bench scale treatment process converted cyanide to cyanate Aqueous cyanide solutions were transferred to Unit 32 for analysis of cyanide content using a cyanide still Very low concentrations of other listed hazardous wastes may have been in these solutions Wastes generated from this analysis were collected in the three 4-liter polyethylene bottles stored in the steel fume hood of the unit The bottom of the fume hood acted as a secondary containment system in the event of a spill There was no automated monitoring system for detecting releases No more than five liters of the cyanide waste were stored in the unit at any given time The cyanide solution was treated in a 4-liter bottle with sodium or calcium hypochlorite to oxidize the cyanide to cyanate A residual chlorine-specific ion electrode was used to determine when the

conversion was complete There have been no documented releases from the polyethylene bottles or spills during transfer or neutralization

The neutralized solution was poured down a process waste drain located in Room 131C and transferred via the process waste line system to Building 374 for further treatment Since the drain is also used for disposal of other wastes generated in the laboratory, the drain and the associated piping will be investigated separately from IHSS 217

2.6.2 Additional Historical Information for IHSS 217

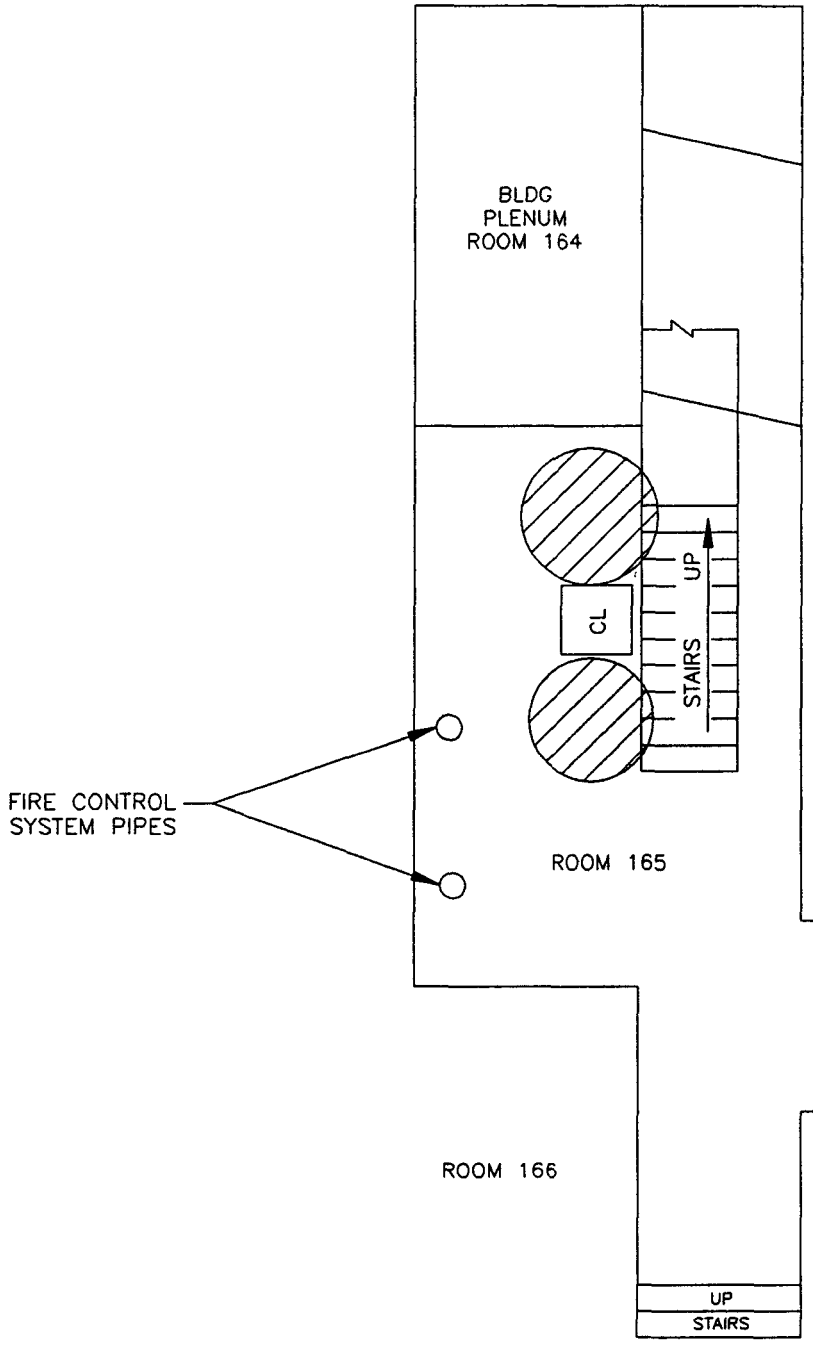
According to the Final Historical Release Report, the cyanide bench scale treatment unit was used from 1986 until September of 1988 The report states, "No documentation was found which indicated a release to the environment" A review of inspection logs which dated from March 1, 1989 through April 27, 1993 revealed no information documenting or alluding to any spills or releases of hazardous wastes or constituents The Task 3/4 Draft Report indicates that the following chemicals of concern have been used in Room 131C nitric acid, potassium chromate, and lead standard

2.6.3 Visual Inspection of IHSS 217

As part of the OU15 Phase I RFI/RI, the site was visited on April 23, 1993 to visually observe the condition of IHSS 217 At the time of the visit, the unit was not operational Two permanently attached crucibles and a removable tray were present on top of the laboratory table surface Some staining was evident on both the laboratory table and fume hood surfaces At the time of the inspection there was an Operational Safety Approval requirement for access into the fume hood

Secondary containment for the laboratory table was provided by the fume hood itself and a lip on the front side of the table The floor in Room 131C was covered with linoleum

tiles which appeared to be in good condition but had some staining There were no secondary containment berms present around Room 131C



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2 PHASE I							
3 RFI/RI							
4 TECH MEMO							
5 NUMBER 1							
BLDG./FACILITY 881							
ROOM/AREA 165							
GRID COOR./COL NO.							
MASTER YES ☐ NO ☒							

DESIGNED	HEA	XX/XX/93
DRAWN	LENNIE	12/21/93
CHECKED	BIERBAUM	XX/XX/93
APPROVED	SCHUBBE	XX/XX/93
SUBMITTED	BIERBAUM	XX/XX/93
APPROVED RFP		
APPROVED DOE		

SCALE NONE

U S DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN,COLORADO

Rocky Flats Plant

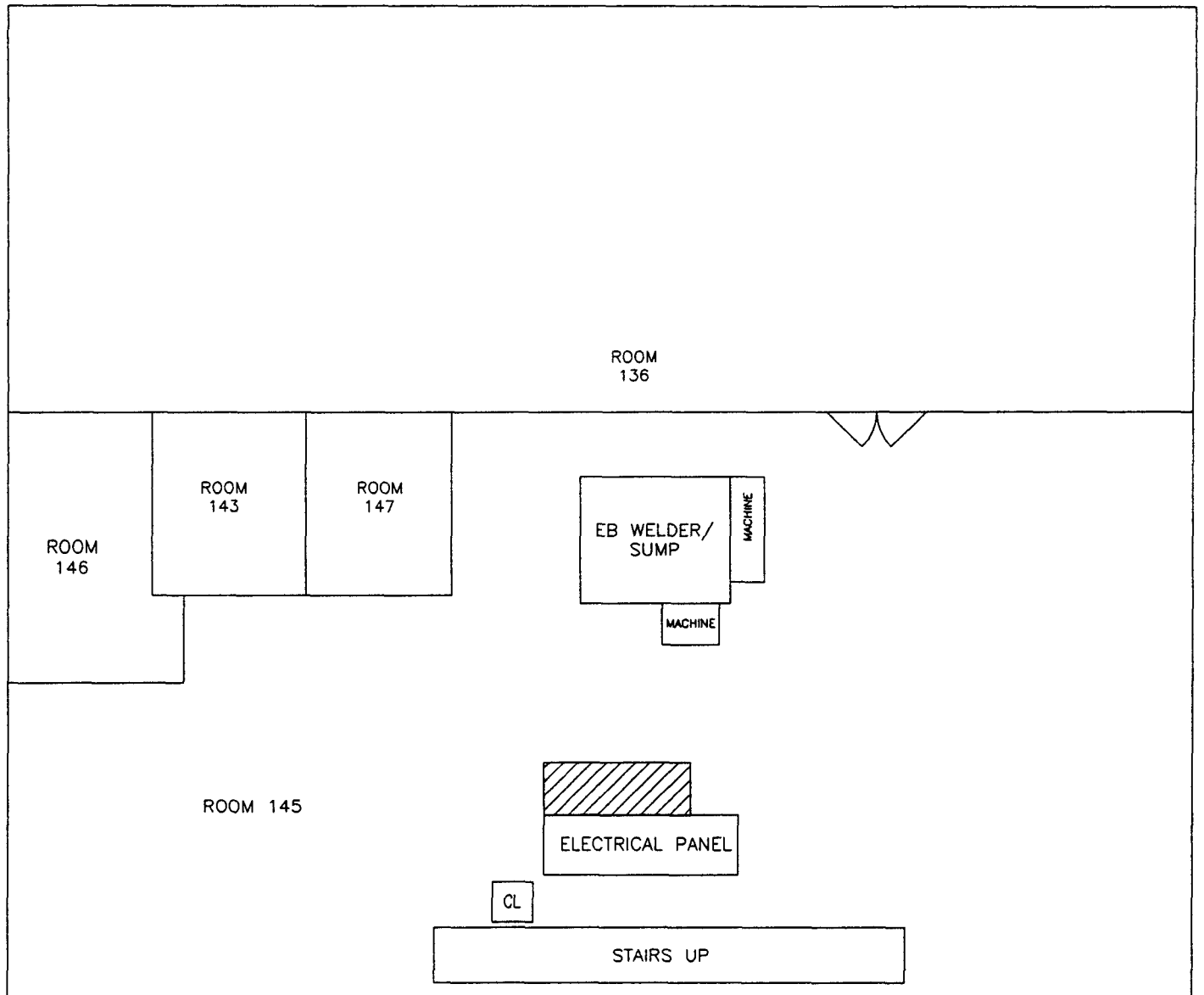
GOLDEN COLORADO 80401

OU15 PHASE I RFI/RI

IHSS 178 LOCATION

SIZE	DRAWING NUMBER	ISSUE	FIGURE
B	IHSS 178	A	2-1

881
165



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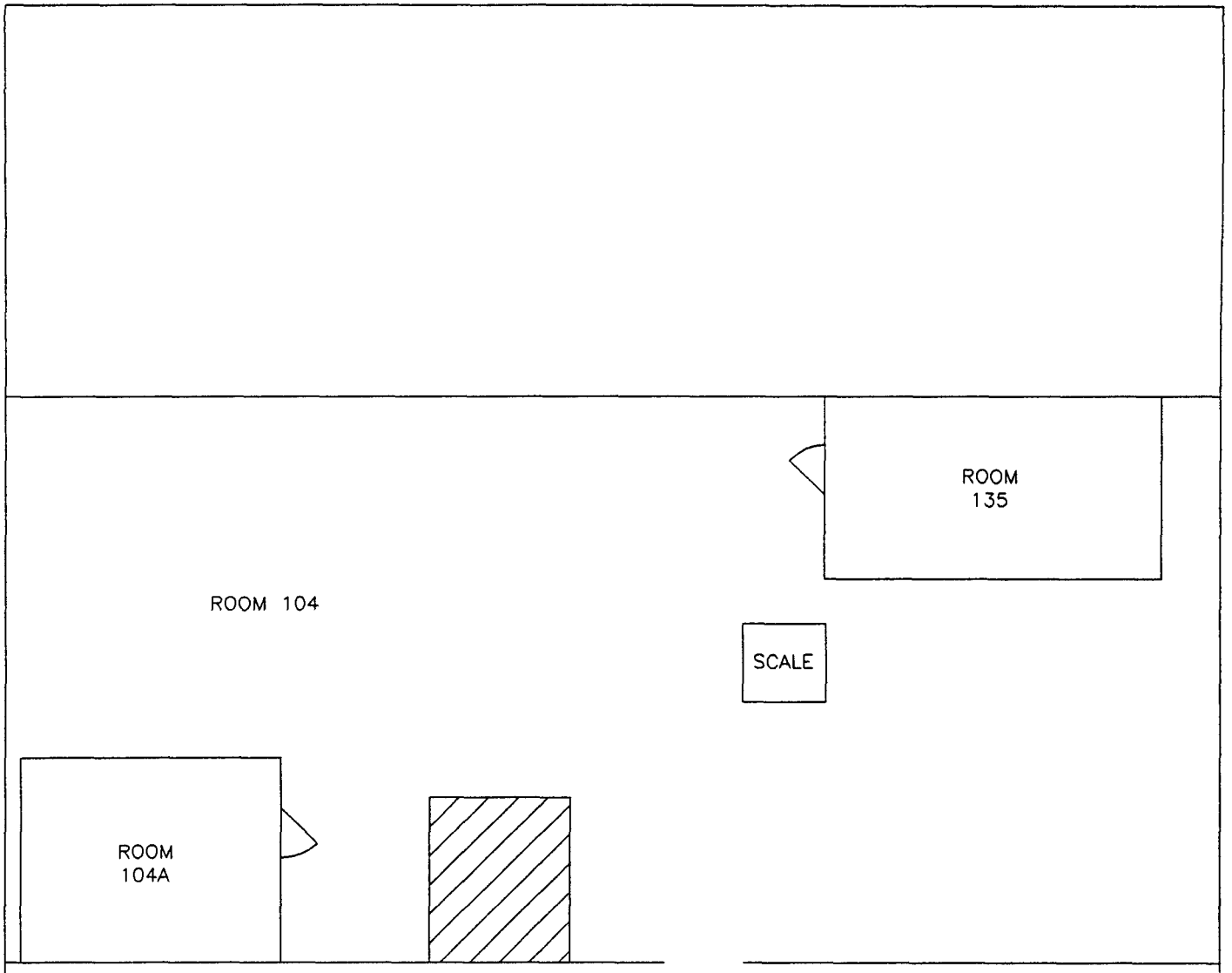
2 PHASE I			DESIGNED	WEAVER	XX/XX/93	U S DEPARTMENT OF ENERGY							
3 RFI/RI			DRAWN	LENNIE	12/21/93	ROCKY FLATS AREA OFFICE GOLDEN COLORADO							
4 TECH MEMO			CHECKED	HEA	XX/XX/93	Rocky Flats Plant							
5 NUMBER 1			APPROVED	SCHUBBE	XX/XX/93	GOLDEN COLORADO 80401							
BLDG./FACILITY 865						OU15 PHASE I RFI/RI							
ROOM/AREA 145						IHSS 179 LOCATION							
GRID COOR./COL NO.			SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER			ISSUE	FIGURE		
MASTER YES ☐ NO ☒	SCALE: NONE		APPROVED RFP			B	IHSS 179			A	2-2		
			APPROVED DOE										

865
145



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3 RFI/RI		DRAWN	LENNIE	12/20/93					
4 TECH MEMO		CHECKED	TERRIEN	XX/XX/93	Rocky Flats Plant				
5 NUMBER 1		APPROVED	SCHUBBE	XX/XX/93	GOLDEN COLORADO 80401				
BLDG./FACILITY 883					OU15 PHASE I RFI/RI				
ROOM/AREA 104					IHSS 180 LOCATION				
GRID COOR./COL NO.		SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER	ISSUE	FIGURE	
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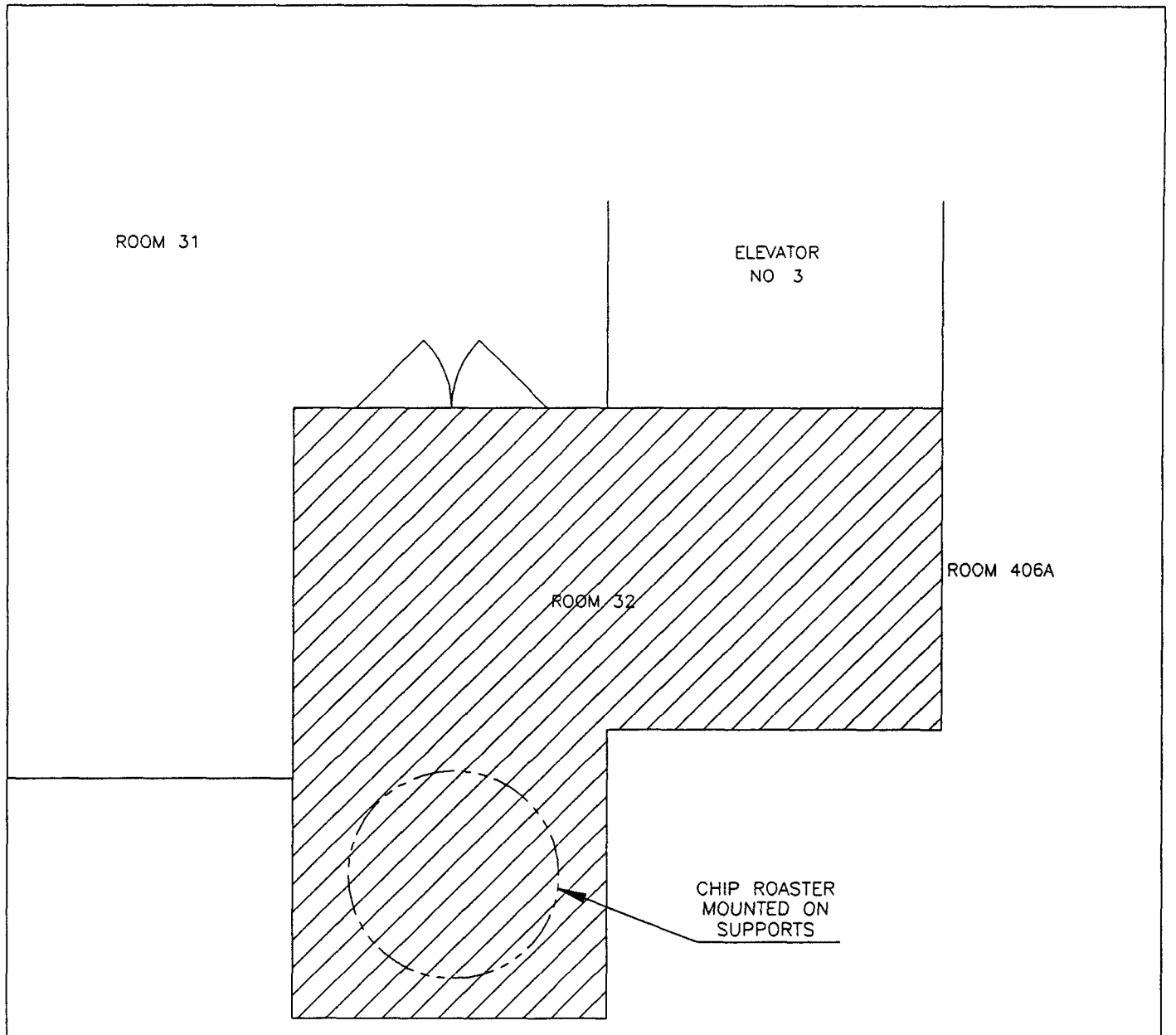
		APPROVED DOE							

883
104



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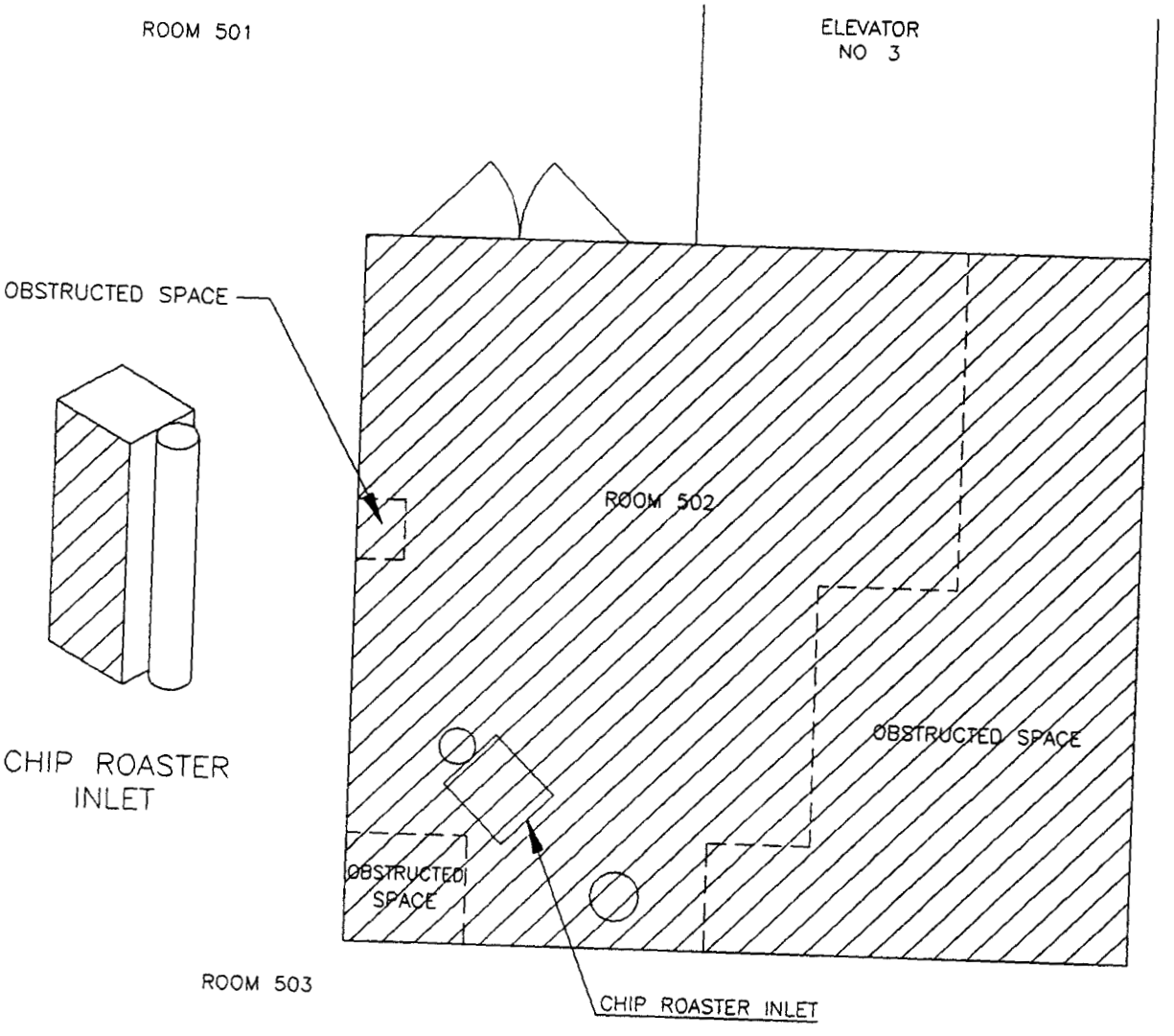
2 PHASE I					U S DEPARTMENT OF ENERGY						
3 RFI/RI		DESIGNED	HEA	XX/XX/93	ROCKY FLATS AREA OFFICE GOLDEN COLORADO						
4 TECH MEMO		DRAWN	LENNIE	12/20/93	Rocky Flats Plant						
5 NUMBER 1		CHECKED	WEAVER	XX/XX/93	GOLDEN COLORADO 80401						
BLDG /FACILITY 447		APPROVED	SCHUBBE	XX/XX/93	OU15 PHASE I RFI/RI						
ROOM/AREA 31/32					IHSS 204 LOCATION						
GRID COOR/COL NO.		SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER			ISSUE	FIGURE	
MASTER YES ☐ NO ☒	SCALE NONE	APPROVED REP			B	IHSS 204			A	2-4	
		APPROVED DOE									

447
31/32



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4 TECH MEMO		DRAWN	LENNIE	XX/XX/93	ROCKY FLATS AREA OFFICE GOLDEN COLORADO									
5 NUMBER 1		CHECKED	WEAVER	XX/XX/93	Rocky Flats Plant									
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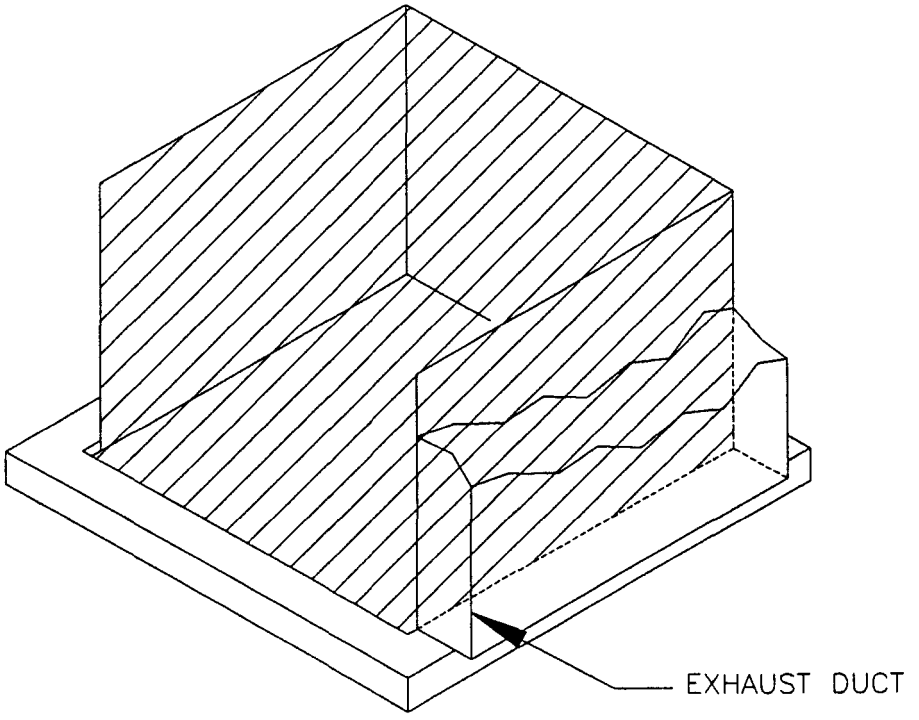
ROOM/AREA 501/502					OU15 PHASE I RFI/RI									
GRID COOR./COL. NO.					IHSS 204 LOCATION									
MASTER YES ☐ NO ☒	SCALE	SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER			ISSUE	FIGURE				
	NONE	APPROVED RFP			B	IHSS 204			A	2-5				
		APPROVED DOE												

447
502



WASH RACK/DRUM WASHING BASIN

KEYWORDS	A	ORIGINAL ISSUE			XX/XX/93	RCH	SRL	DAW	DLS					
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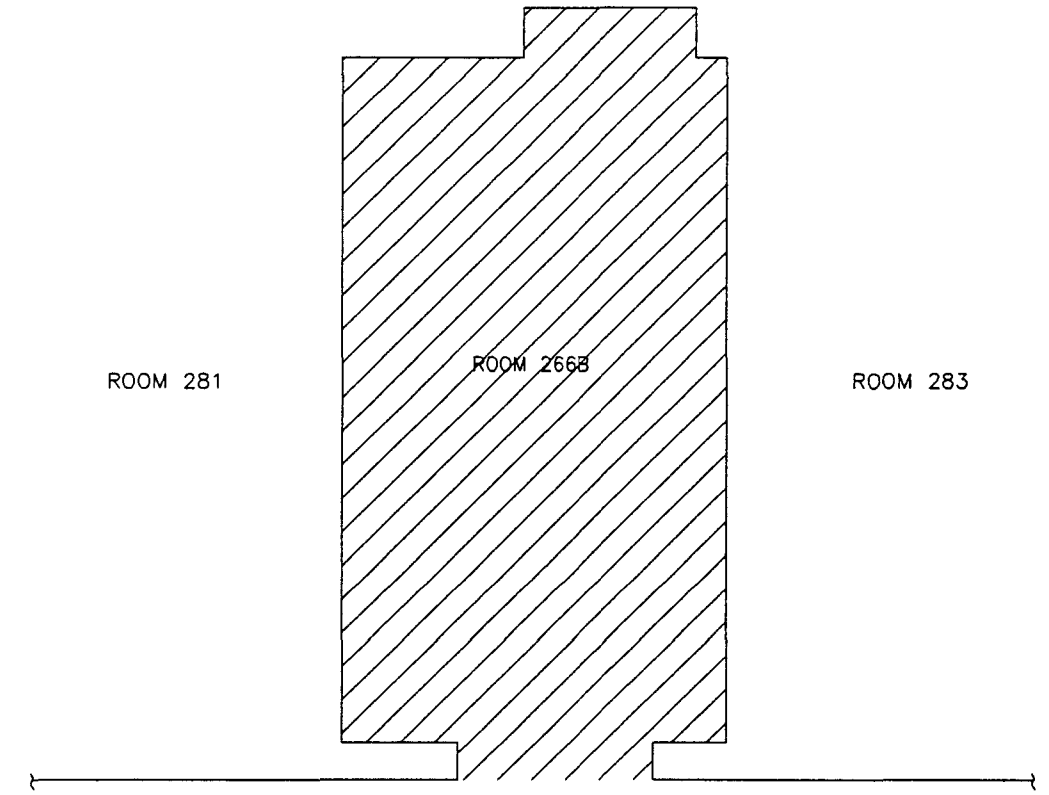
2 PHASE I					U S DEPARTMENT OF ENERGY									
3 RFI/RI			DESIGNED	HEA	XX/XX/93	ROCKY FLATS AREA OFFICE GOLDEN COLORADO								
4 TECH MEMO			DRAWN	SCHACKLIN	12/20/93	Rocky Flats Plant								
5 NUMBER 1			CHECKED	WEAVER	XX/XX/93	GOLDEN COLORADO 80401								
BLDG./FACILITY 447			APPROVED	SCHUBBE	XX/XX/93	OU15 PHASE I RFI/RI								
ROOM/AREA 501						IHSS 204 LOCATION								
GRID COOR./COL NO			SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER			ISSUE	FIGURE			
MASTER YES ☐ NO ☒	SCALE. NONE		APPROVED RFP			B	IHSS 204			A	2-6			
			APPROVED DOE											

447

501



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3 RFI/RI			DRAWN	LENNIE	12/20/93	ROCKY FLATS AREA OFFICE GOLDEN COLORADO							
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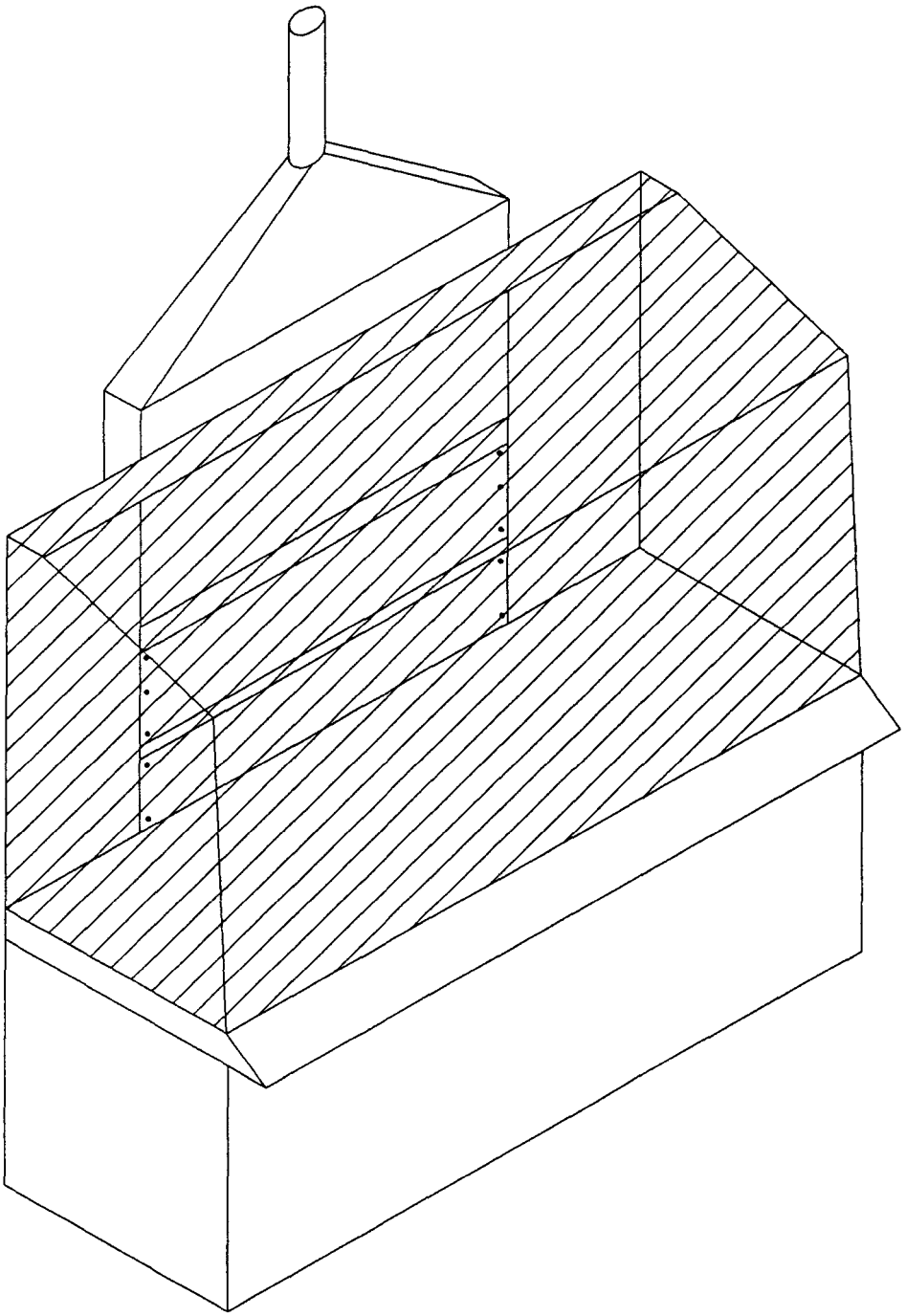
BLDG./FACILITY 881						OU15 PHASE I RFI/RI							
ROOM/AREA 266B						IHSS 211 LOCATION							
GRID COOR./COL NO.			SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER			ISSUE	FIGURE		
MASTER YES ☐ NO ☒	SCALE NONE		APPROVED RFP			B	IHSS 211			A	2-7		
			APPROVED DOE										

881
266B

CYANIDE BENCH SCALE TREATMENT LABORATORY TABLE AND FUME HOOD



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4 TECH MEMO		DRAWN	LENNIE	12/20/93	Rocky Flats Plant										
5 NUMBER 1		CHECKED	BIERBAUM	XX/XX/93	GOLDEN COLORADO 80401										
BLDG./FACILITY 881		APPROVED	SCHUBBE	XX/XX/93	OU15 PHASE I RFI/RI										
ROOM/AREA 131C					IHSS 217 LOCATION										
GRID COOR./COL NO.		SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER				ISSUE	FIGURE				
MASTER YES ☐ NO ☒	SCALE NONE	APPROVED RFP			B	IHSS 217				A	2-8				
		APPROVED DOE													

881
131C

Section 3.0

3.0 METHODS

This section summarizes the sampling and analysis performed during the combined Stage I and II field investigation It also describes the FSP sampling, analytical, and quality assurance/quality control (QA/QC) procedures that were followed Additional detail on the FSP is provided in Section 7 0 of the Work Plan

3.1 Sampling Activities

Sampling activities were conducted from April 23, 1993 to November 9, 1993 to characterize contamination inside and around the perimeter of each IHSS Samples were also collected along pathways outside the perimeter and leading away from the IHSS that might have been impacted by spilled material migrating out of the IHSS

Activities performed as part of the investigation included

- a review of new and/or additional information (documented in Section 2 0),
- a visual inspection and documentation of current conditions (documented in Section 2 0), and
- the sampling and analysis of surfaces within each IHSS area

Sampling was conducted to characterize contamination within the IHSS, perimeter, and pathway areas Smear sampling for removable radiological (alpha and beta) and, if appropriate, beryllium contamination was performed first This was followed by hot water sampling and rinsate analysis for Target Compound List (TCL) VOCs, TCL semi-volatile organic compounds, Target Analyte List (TAL) dissolved metals, dissolved radionuclides, and cyanide, as appropriate for each IHSS Finally, a second set of removable alpha, beta, and (if applicable) beryllium analyses, along with fixed alpha and

beta analyses, and beta and gamma dose-rate surveys were performed, as appropriate for each IHSS

The combined Stage I and II investigation programs for each IHSS are summarized in Table 3-1 which details the field sampling and analysis completed Additional information regarding the number and location of radiological and hot water rinsate samples collected for each IHSS is included in the following subsections

3.1.1 IHSS 178 - Building 881 Drum Storage Area

Following the review of new data and information, and after the visual inspection of IHSS 178, 30 radiological smear samples were collected at the locations shown in Figure 3-1 Three hot water rinsate samples were then obtained from the IHSS, perimeter, and pathway areas as shown in Figure 3-2 Final radiological surveys at each of the 30 initial smear sample locations shown in Figure 3-1 completed the Stage I and II field investigation of IHSS 178

3.1.2 IHSS 179 - Building 865 Drum Storage Area

Following the review of new data and information, and after the visual inspection of IHSS 179, 23 radiological and beryllium smear samples were collected at the locations shown in Figure 3-3 Three hot water rinsate samples were then obtained from the IHSS, perimeter, and pathway areas as shown in Figure 3-4 Final radiological surveys at each of the 23 initial smear sample locations shown in Figure 3-3 completed the Stage I and II field investigation of IHSS 179

3.1.3 IHSS 180 - Building 883 Drum Storage Area

Following the review of new data and information, and after the visual inspection of IHSS 180, 49 radiological and beryllium smear samples were collected at the locations shown in Figure 3-5 Four hot water rinsate samples were then obtained from the IHSS, perimeter, and pathway areas as shown in Figure 3-6 The weigh scale located adjacent to the IHSS was not disassembled to perform either hot water rinsate or radiological sampling beneath the scale plate Final radiological surveys at each of the 49 initial smear sample locations shown in Figure 3-5 completed the Stage I and II field investigation of IHSS 180

3.1.4 IHSS 204 - Unit 45, Original Uranium Chip Roaster

Following the review of new data and information, and after the visual inspection of IHSS 204, radiological smear samples were collected from the areas that compose IHSS 204 Thirty-three smear samples were collected from the floor in Rooms 31 and 32, and one sample was collected from the exterior surface of the oxide outlet of the Original Uranium Chip Roaster Figure 3-7 shows the locations for these samples Thirty-one smear samples were collected from the floor in Rooms 501 and 502, and two samples were collected from the exterior surface of the chip inlet of the Original Uranium Chip Roaster Figure 3-8 shows these sample locations Ten smear samples were also collected from the Wash Rack/Drum Washing Basin in Room 501 as shown in Figure 3-9

Seven hot water rinsate samples were obtained from the areas that compose IHSS 204 One rinsate sample was collected from the floor of Room 31, Room 32, Room 501, and Room 502 One sample was also collected from the exterior surface of the oxide outlet and from the exterior surface of the chip inlet of the Original Uranium Chip Roaster One rinsate sample was collected from the floor in Room 501, and one rinsate sample

was also collected from the Wash Rack/Drum Washing Basin in Room 501 One sample was collected from the floor in Room 502 Sampling locations are shown in Figures 3-10, 3-11, and 3-12 In accordance with the requirements of the Work Plan, no final radiological surveys were performed for IHSS 204

3.1.5 IHSS 211 - Unit 26, Building 881 Drum Storage Area

Following the review of new data and information, and after the visual inspection of IHSS 211, 32 radiological smear samples were collected at the locations shown in Figure 3-13 Three hot water rinsate samples were then obtained from the IHSS, perimeter, and pathway areas as shown in Figure 3-14 Final radiological surveys at each of the 32 initial smear sample locations shown in Figure 3-13 completed the Stage I and II field investigation of IHSS 211

3.1.6 IHSS 217 - Unit 32, Cyanide Bench Scale Treatment

Following the review of new data and information, and after the visual inspection of IHSS 217, five radiological smear samples were collected from the floor adjacent to the laboratory table (perimeter) and eight samples were collected from the laboratory table and fume hood (IHSS) at the locations shown in Figures 3-15 and 3-16, respectively One hot water rinsate sample was then obtained from each of these areas as shown in Figures 3-17 and 3-18 Final radiological surveys at each of the 13 initial smear sample locations shown in Figures 3-15 and 3-16 completed the Stage I and II field investigation of IHSS 217

3.2 Sample Collection and Field Analysis Procedures

This section describes the procedures used to collect radiological and beryllium smear samples, and hot water rinsate samples, and to perform the final radiological surveys during the Stage I and II field investigations

3.2.1 Smear Sample Collection

All smear samples were obtained according to procedures outlined in Radiological Operating Instruction (ROI) 3 1 This procedure is equivalent to Environmental Management Radiological Guidelines (EMRG) Section 3 1 (Performance of Surface Contamination Surveys) Each IHSS, along with its associated perimeter and pathway areas, was divided into sampling areas measuring one square meter each To collect the samples, smear paper was rubbed over an area of approximately 100 square centimeters within each square meter

The smear samples were analyzed with an Eberline SAC-4 Alpha-Scintillation Smear Counting Instrument for alpha counting and an Eberline BC-4 Beta Smear Counting Instrument for beta counting All smear samples from IHSS 179 and IHSS 180 were also analyzed for beryllium using the on-site beryllium counter (the Beryllium Activated Swipe Test) Radiological results were recorded on data sheets by EG&G Radiation Protection Technologists (RPTs), beryllium results were recorded by EG&G Industrial Hygiene technicians

3.2.2 Hot Water Rinsate Sample Collection

Hot water rinsate samples were collected in accordance with EG&G SOP (Standard Operating Procedure) FO 27 (Collection of Floor/Equipment Hot Water Rinsate Samples) The hot water rinsate sample collection system designed for use during the OU15 field investigation consisted of a series of modular components divided into two major groups The first group included a spray applicator and vacuum head, an interceptor can/receiver, and associated connecting hoses and fittings To prevent cross-contamination between IHSSs, a set of this equipment was dedicated to each of the IHSSs sampled The second equipment group consisted of a hot water reservoir and heater, a High Efficiency Particulate Air vacuum unit, an activated carbon adsorption unit, and associated connecting hoses and fittings This equipment was reused for all of the IHSSs sampled, because the equipment was remotely positioned outside of the IHSS and potentially contaminated areas A schematic of the hot water rinsate sample collection system is shown in Figure 3-19

The hot water spray was applied to and vacuumed from the sample areas in a manner which allowed the entire sample area to be uniformly covered Hot water was applied at the rate necessary to generate enough sample volume to perform the required sample analyses In all cases, however, the application rate was kept below 0 17 gallons per square foot to avoid an unrepresentative dilution of the sample

The hot water rinsate samples were collected from the rinsate sample bag located in the interceptor can/receiver Sample collection procedures were followed as specified in EG&G SOP FO 27 The approximate volume of sample was determined by weighing the sample bag and its contents, and field parameters including pH, temperature, and conductivity (specific conductance) were measured in accordance with EG&G SOP SW 2 (Field Measurement of Surface Water) Any unusual observations about the liquid, including color or odor were recorded in the field book All chain of custody forms and

field documentation were completed in accordance with the requirements of EG&G SOP FO 13 (Containerizing, Preserving, Handling, and Shipping Soil and Water Samples) and the Work Plan

3.2.3 Final Radiological Surveys

A second set of removable alpha, beta, and, if applicable, beryllium analyses, fixed alpha and beta radiological surveys, and beta and gamma dose rate surveys were performed for each of the one square meter areas sampled during the initial smear sample collection, with the exception of those associated with IHSS 204 The final radiological surveys were conducted and recorded as specified in ROIs 1 1, 1 2 and 3 1 These procedures are the equivalent of EMRG Section 1 1 (Gamma Radiation Surveys), Section 1 2 (Beta Radiation Surveys), and Section 3 1 (Performance of Surface Contamination Surveys), respectively

The second set of smear samples were collected and analyzed using the procedure outlined in Section 3 2 1 A Ludlum Model 12-1A count-rate instrument (or equivalent) was used for measuring direct alpha activity and a Ludlum Model 31 (or equivalent) was used for direct measurement of beta activity Beta and gamma dose-rate surveys were performed using a Victoreen 450B instrument

3.3 Chemical and Radionuclide Laboratory Analysis Methods

Hot water rinsate samples were analyzed for some or all of the following parameters

- TAL dissolved metals
- TCL VOCs
- TCL semi-volatile organic compounds
- dissolved radionuclides
- cyanide

The specific analytes and detection/quantification limits for the OU15 Phase I RFI/RI are identified in the Work Plan by reference to EPA Contract Laboratory Program (CLP) analyses and the General Radiochemistry and Routine Analytical Services Protocol (GRRASP) (EG&G, 1991) Part A of the GRRASP provides hazardous substance list analytes and limits using CLP methods Part B of the GRRASP provides analytes and detection limits for radionuclides

3.4 Data Quality Assurance/Quality Control

Four types of QA/QC samples were collected for the hot water rinsate sampling in accordance with the requirements of Section 6 3 of EG&G SOP FO 27 The hot water source or field blanks (taken from the field water source prior to being used for rinsate generation), sample duplicates, equipment rinsate blanks, and trip blanks were analyzed for the same constituents as their associated real samples A summary of all individual hot water rinsate and QA/QC samples collected is provided in Table 3-2 and is sorted by IHSS In Building 881, the same hot water source was used for sampling IHSSs 178, 211 and 217, therefore, only one hot water source sample was collected Since IHSSs 179, 180 and 204 each had a different hot water source, one sample was collected from each source

The equipment rinsate blanks collected in the field measured the effectiveness of sampling equipment decontamination, but did not measure the impact of the entire hot water rinsate sampling system in an operating mode Therefore, three equipment blank samples, or hot water rinsate blanks, were collected from the hot water rinsate sampling system on April 27, 1994 at an off-site location These samples were collected by using the entire sampling system to rinse a clean glass surface Distilled water was used as the source water These samples were analyzed to determine the influence of the sampling equipment on the hot water rinsate samples collected during the Stage I and II field investigations A trip blank sample accompanied the three equipment blank samples

3.5 *Data Processing and Storage*

Hot water rinsate samples collected from floor areas and designated equipment were assigned sequential numbers based on the order in which they were collected Each sample and associated location was marked on the corresponding IHSS diagram, measured relative to IHSS structures, and described in the designated field book

In order to maintain consistency with the Rocky Flats Environmental Database System (RFEDS) sample numbering system, a block of sample numbers was assigned by EG&G Environmental Restoration Sample Management for the OU15 Phase I RFI/RI hot water rinsate samples The RFEDS sample numbers consist of a two digit sample prefix indicating sample type, a five digit serial number identifying the sample, and a suffix identifying the contractor collecting the sample For example, the sample number BU00011ER indicates a building sample (BU), serial number eleven (00011), collected by ERM-Rocky Mountain, Inc (ER)

Location codes have also been established in the RFEDS for each sample Each location code consists of seven digits and describes where its associated sample was collected The first three digits in each location code identify the building in which the IHSS is located, the second three digits represent the particular IHSS, and the last digit indicates the sample area (e g , the IHSS [1], perimeter, [2] or pathway [3]) For example, the location code 8811782, identifies that the sample was collected from the perimeter area of IHSS 178 in Building 881 For IHSS 204, a different set of numbers was used to designate the sample area (the last digit in the location code), due to the greater number and variety of hot water rinsate sampling locations Sample area identifiers for IHSS 204 were defined as follows The Wash Rack/Drum Washing Basin (1), the floor in Room 501 (2), the floor in Room 502 (3), the chip inlet (4), the floor in Room 31 (5), the floor in Room 32 (6), and the oxide outlet (7)

Data collected during the initial radiological and beryllium smear sampling, and the final radiological surveys were recorded directly on data sheets by EG&G RPTs and Industrial Hygiene technicians Sample/survey locations were determined based on the layout of one square meter grids For each IHSS, the position of the sampling/survey squares was plotted on the IHSS diagram and numbered sequentially Sample/survey results were then identified and tracked by this numbering scheme These radiological data were not compatible with the RFEDS structure, so they are instead maintained in hard copy form in the project files Data generated from both the radiological sampling and surveys and the hot water rinsate sampling are managed in accordance with the prescribed QA/QC procedures described in EG&G SOP FO 14 (Field Data Management)

Table 3-1
OU15 Field Investigation Activities

IHSS	Data Review	Visual Inspection	Smear Sampling		Hot Water Rinsate Sampling/Analysis					Final Radiological Surveys			
										Smear Samples			
			Rads	Be	VOCs	Semi-VOCs	Rads	Metals	Cyanide	Rads	Be	Fixed	Dose-Rate
178	X	X	X		X	X	X			X		X	X
179	X	X	X	X	X	X	X			X	X	X	X
180	X	X	X	X	X	X	X			X	X	X	X
204	X	X	X		X	X	X						
211	X	X	X		X	X	X	X		X		X	X
217	X	X	X		X	X	X	X	X	X		X	X

Table 3-2
Summary of Hot Water Rinsate Real & QA/QC Samples

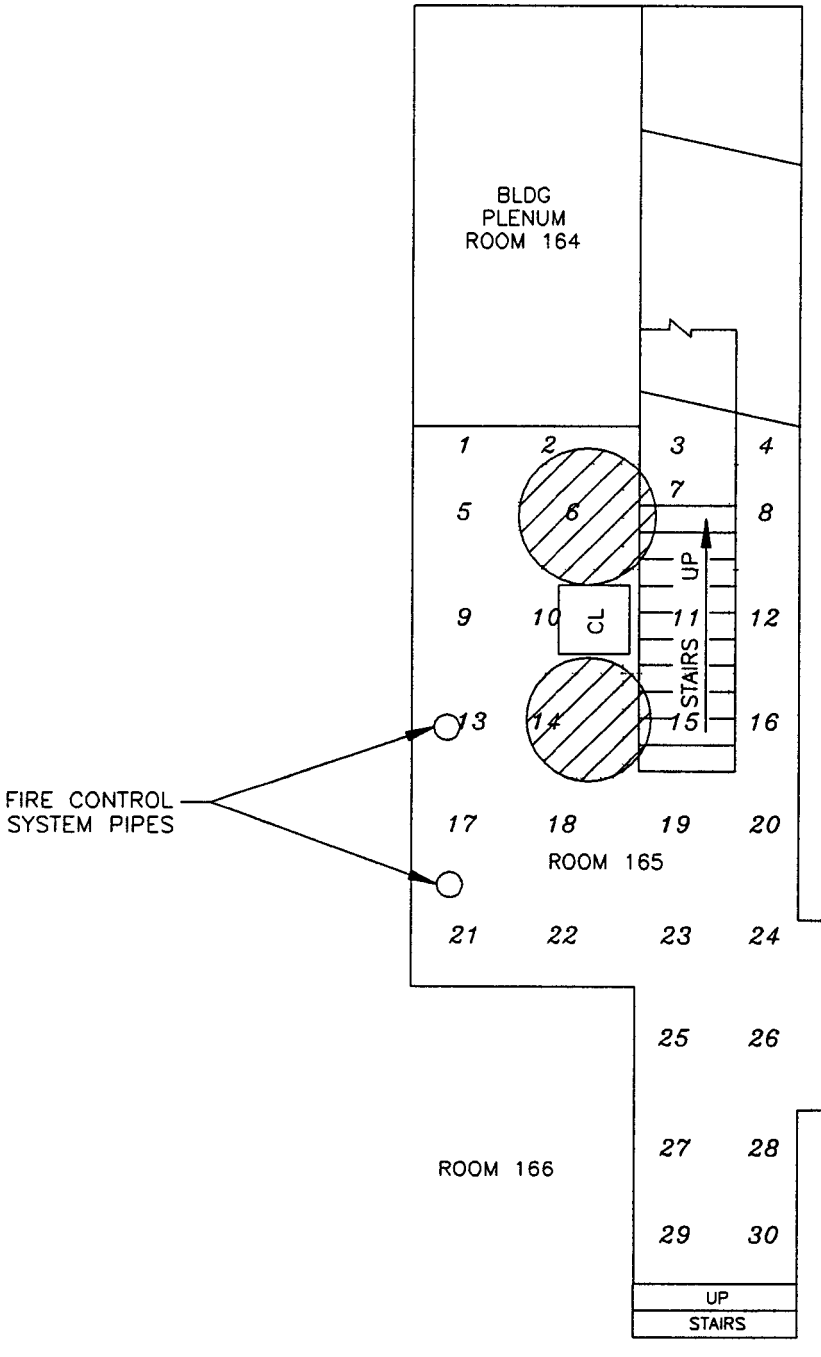
IHSS	Date Sampled	Hot Water Rinsate Sample	Field Blank	Sample Duplicate	Trip Blank	Equipment Rinse
178	08/16/93	BU00011ER (IHSS)	BU00001ER (From tap in Room 261)	BU00012ER	BU00010ER	BU00013ER
		BU00014ER (Perimeter)	---	---	---	---
		BU00015ER (Pathway)	---	---	---	---
179	09/15/93	BU00033ER (Perimeter)	BU00032ER (From tap in Room 145)	BU00034ER	BU00031ER	BU00035ER
		BU00036FR (IHSS)	---	---	---	---
		BU00037ER (Pathway)	---	---	---	---
180	09/01/93	BU00023ER (IHSS)	BU00022ER (From tap in Room 104)	BU00024ER	BU00021ER	BU00025ER
		BU00026ER (Perimeter)	---	---	---	---
	09/02/93	BU00027ER (Pathway)	---	BU00028ER	---	BU00029ER
		BU00030ER (Pathway)	---	---	---	---

Table 3-2
Summary of Hot Water Rinsate Real & QA/QC Samples

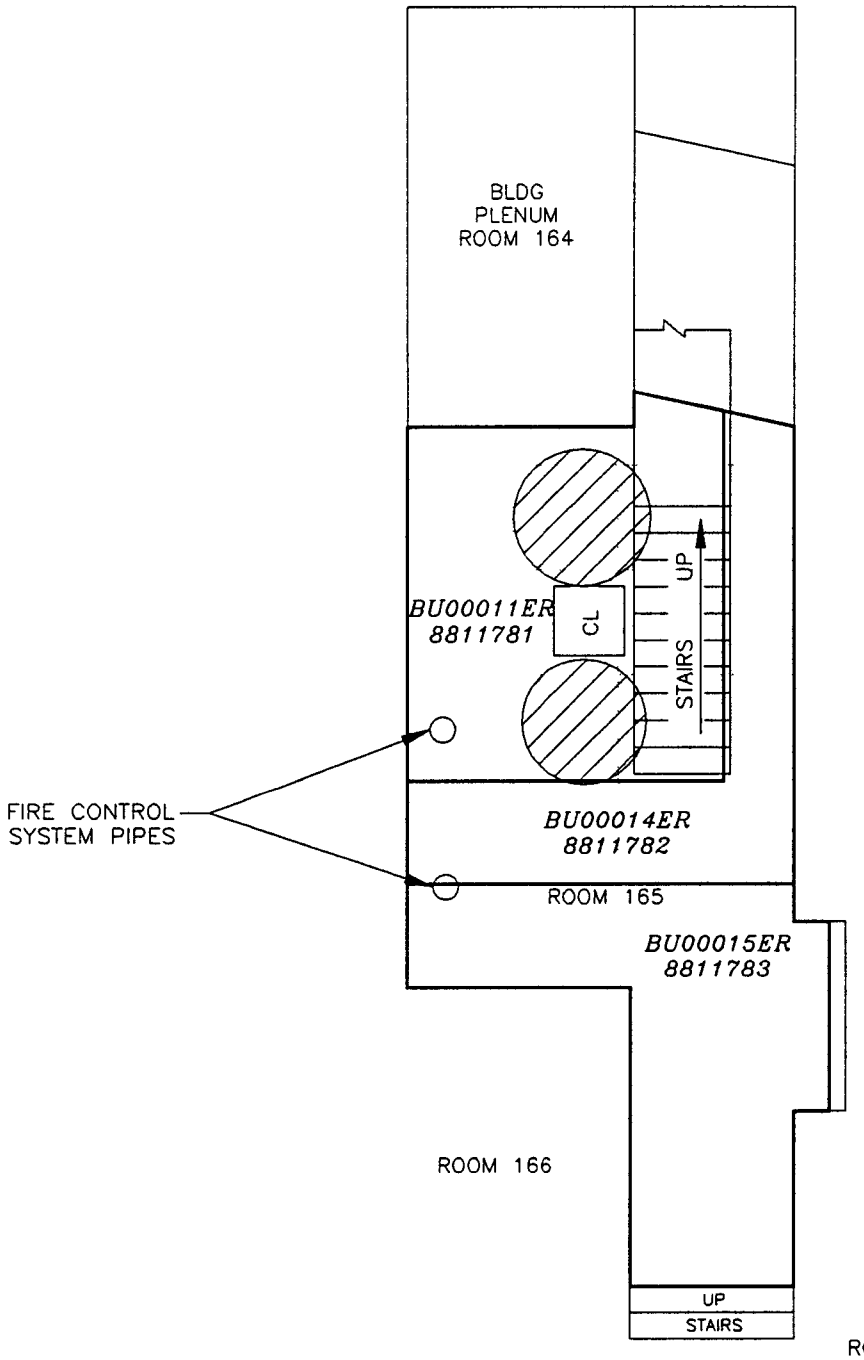
IHSS	Date Sampled	Hot Water Rinsate Sample	Field Blank	Sample Duplicate	Trip Blank	Equipment Rinse
204	10/11/93	BU00040ER (Wash Rack)	BU00039ER (From tap in Room 501)	BU00041ER	BU00038ER	BU00042ER
		BU00043ER (Rm 501 Perimeter)	---	---	---	---
		BU00044ER (Rm 502 IHSS)	---	---	---	---
		BU00045ER (Chip Inlet)	---	---	---	---
	11/09/93	BU00047ER (Rm 31 Perimeter)	---	BU00048ER	BU00046ER	BU00049ER
		BU00050ER (Rm 32 IHSS)	---	---	---	---
		BU00051ER (Oxide Outlet)	---	---	---	---

Table 3-2
Summary of Hot Water Rinsate Real & QA/QC Samples

IHSS	Date Sampled	Hot Water Rinsate Sample	Field Blank	Sample Duplicate	Trip Blank	Equipment Rinse
211	08/09/93	BU00002ER (IHSS)	BU00001ER (From tap in Room 261)	BU00003ER	BU00005ER	BU00004ER
	08/11/93	BU00006ER (Perimeter)	---	---	---	BU00007ER
		BU00008ER (Pathway)	---	BU00009ER	---	---
217	08/17/93	BU00017ER (IHSS)	BU00001ER (From tap in Room 261)	BU00018ER	BU00016ER	BU00019ER
		BU00020ER (Perimeter)	---	---	---	---

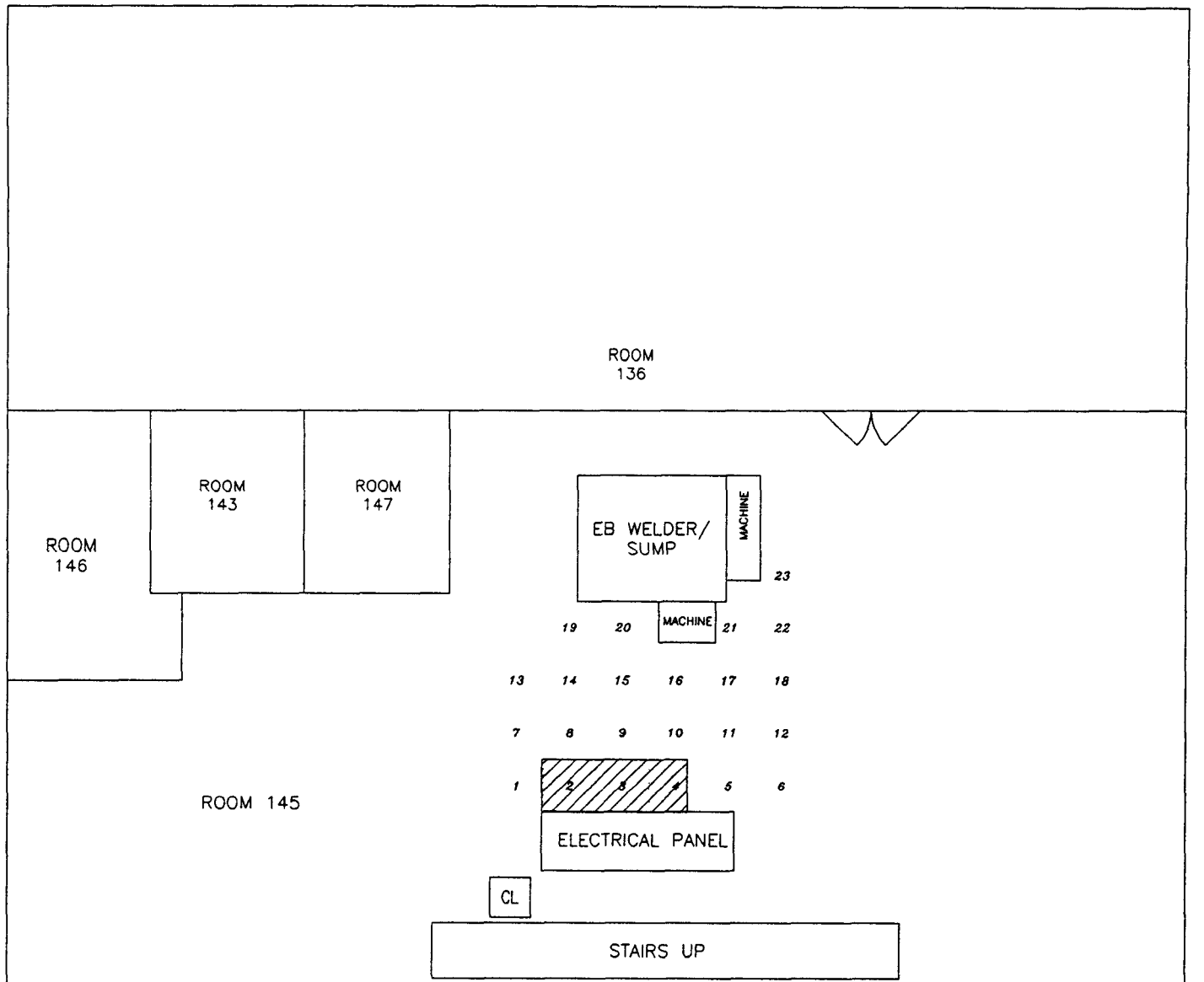


KEYWORDS	A	ORIGINAL ISSUE			XX/XX/93	RCH	SRL	PRB	DLS						
1 OU15	ISSUE	DESCRIPTION			DATE		RFP				DOE	CLASS	JOB NO		
2 PHASE I					U S DEPARTMENT OF ENERGY										
3 RFI/RI			DESIGNED	HEA	XX/XX/93	ROCKY FLATS AREA OFFICE GOLDEN COLORADO									
4 TECH MEMO			DRAWN	LENNIE	12/21/93	Rocky Flats Plant									
5 NUMBER 1			CHECKED	BIERBAUM	XX/XX/93	GOLDEN,COLORADO 80401									
BLDG./FACILITY 881			APPROVED	SCHUBBE	XX/XX/93	OU15 PHASE I RFI/RI									
ROOM/AREA 165						IHSS 178 RAD SAMPLE LOCATIONS									
GRID COOR./COL NO.			SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER				ISSUE	FIGURE			
MASTER YES ☐ NO ☒	SCALE NONE		APPROVED RFP			B	IHSS 178				A	3-1			
			APPROVED DOE												



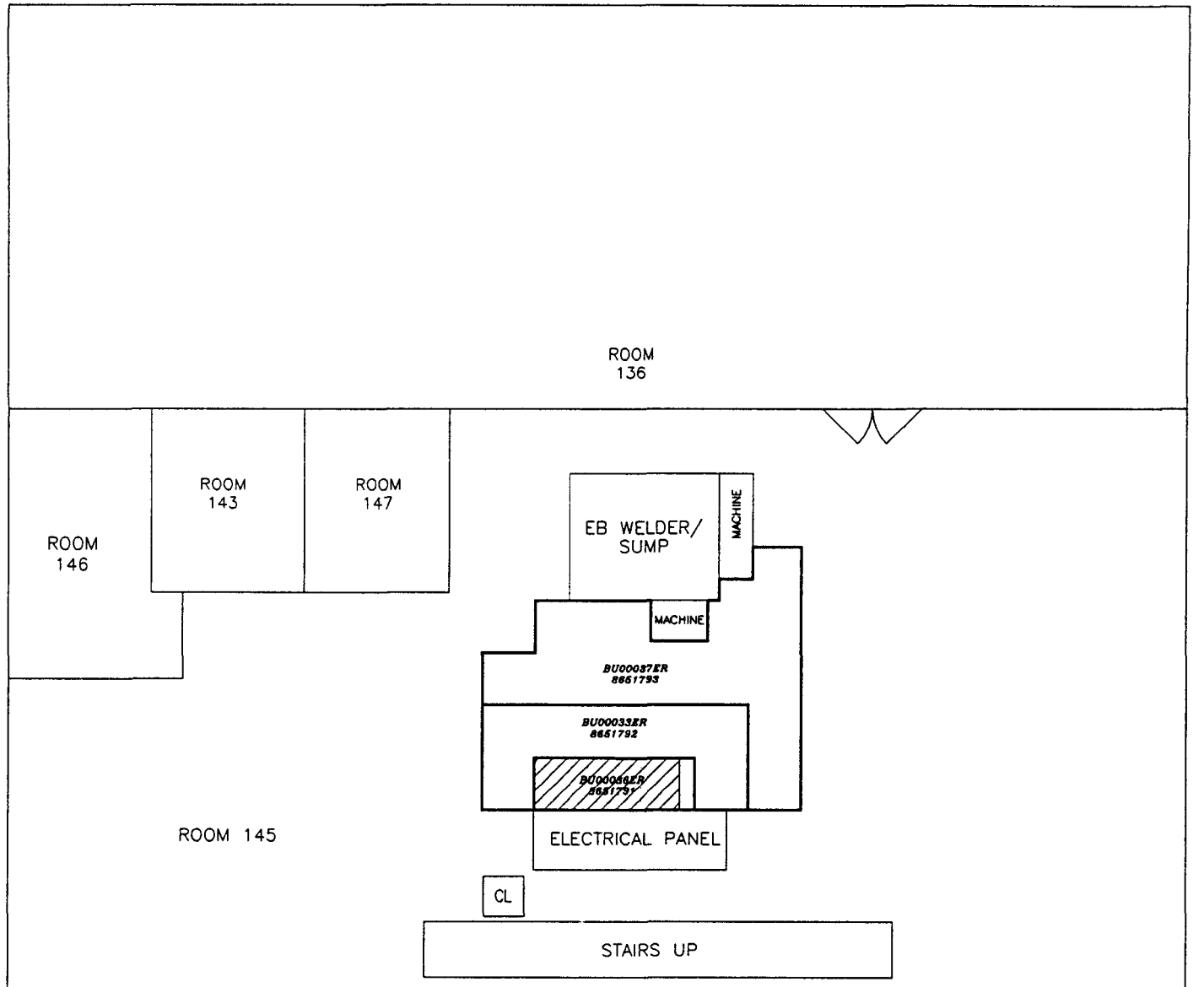
KEYWORDS	A	ORIGINAL ISSUE			XX/XX/93	RCH	SRL	PRB	DLS				
1 OU15	ISSUE	DESCRIPTION			DATE	RFP				DOE	CLASS	JOB NO	
2 PHASE I		DESIGNED	HEA	XX/XX/93	U S DEPARTMENT OF ENERGY ROCKY FLATS AREA OFFICE GOLDEN COLORADO								
3 RFI/RI		DRAWN	LENNIE	12/21/93	Rocky Flats Plant								
4 TECH MEMO		CHECKED	BIERBAUM	XX/XX/93									
5 NUMBER 1		APPROVED	SCHUBBE	XX/XX/93	GOLDEN COLORADO 80401								
BLDG /FACILITY 881					OU15 PHASE I RFI/RI								
ROOM/AREA 165					IHSS 178 RINSATE SAMPLE LOCATIONS								
GRID COOR./COL NO		SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER					ISSUE	FIGURE	
MASTER YES ☐ NO ☒	SCALE NONE	APPROVED RFP			B	IHSS 178					A	3-2	
		APPROVED DOE											

881
165



KEYWORDS	ISSUE	DESCRIPTION			DATE	RFP	DOE	CLASS	JOB NO
1 OU15	A	ORIGINAL ISSUE			XX/XX/93	DAW SRL RCH DLS			
2 PHASE I		DESIGNED	WEAVER	XX/XX/93	U S DEPARTMENT OF ENERGY ROCKY FLATS AREA OFFICE GOLDEN COLORADO				
3 RFI/RI		DRAWN	LENNIE	12/21/93	Rocky Flats Plant GOLDEN, COLORADO 80401				
4 TECH MEMO		CHECKED	HEA	XX/XX/93					
5 NUMBER 1		APPROVED	SCHUBBE	XX/XX/93					
BLDG./FACILITY 865					OU15 PHASE I RFI/RI				
ROOM/AREA 145					IHSS 179 RAD SAMPLE LOCATIONS				
GRID COOR./COL NO.		SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER	ISSUE	FIGURE	
MASTER YES ☐ NO ☒	SCALE NONE	APPROVED RFP			B	IHSS 179	A	3-3	
		APPROVED DOE							

865
145



KEYWORDS	ISSUE	DESCRIPTION	DATE	RFP	DOE	CLASS	JOB NO
1 OU15	A	ORIGINAL ISSUE	XX/XX/93	DAW SRL RCH DLS			
2 PHASE I							
3 RFI/RI							
4 TECH MEMO							
5 NUMBER 1							
BLDG./FACILITY 865							
ROOM/AREA 145							
GRID COOR /COL NO.							
MASTER YES ☐ NO ☒							

DESIGNED	WEAVER	XX/XX/93
DRAWN	LENNIE	12/21/93
CHECKED	HEA	XX/XX/93
APPROVED	SCHUBBE	XX/XX/93
SUBMITTED	BIERBAUM	XX/XX/93
APPROVED RFP		
APPROVED DOE		

U S DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN COLORADO

Rocky Flats Plant

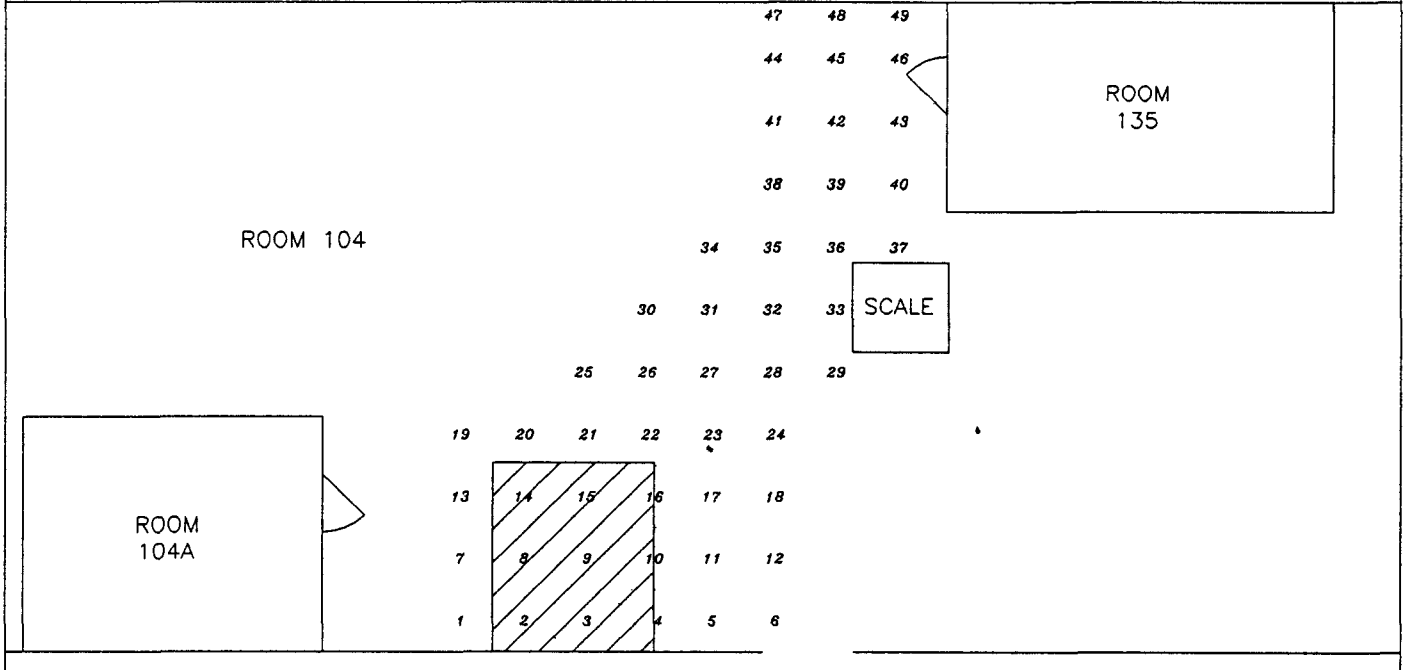
GOLDEN COLORADO 80401

OU15 PHASE I RFI/RI

IHSS 179 RINSATE SAMPLE LOCATIONS

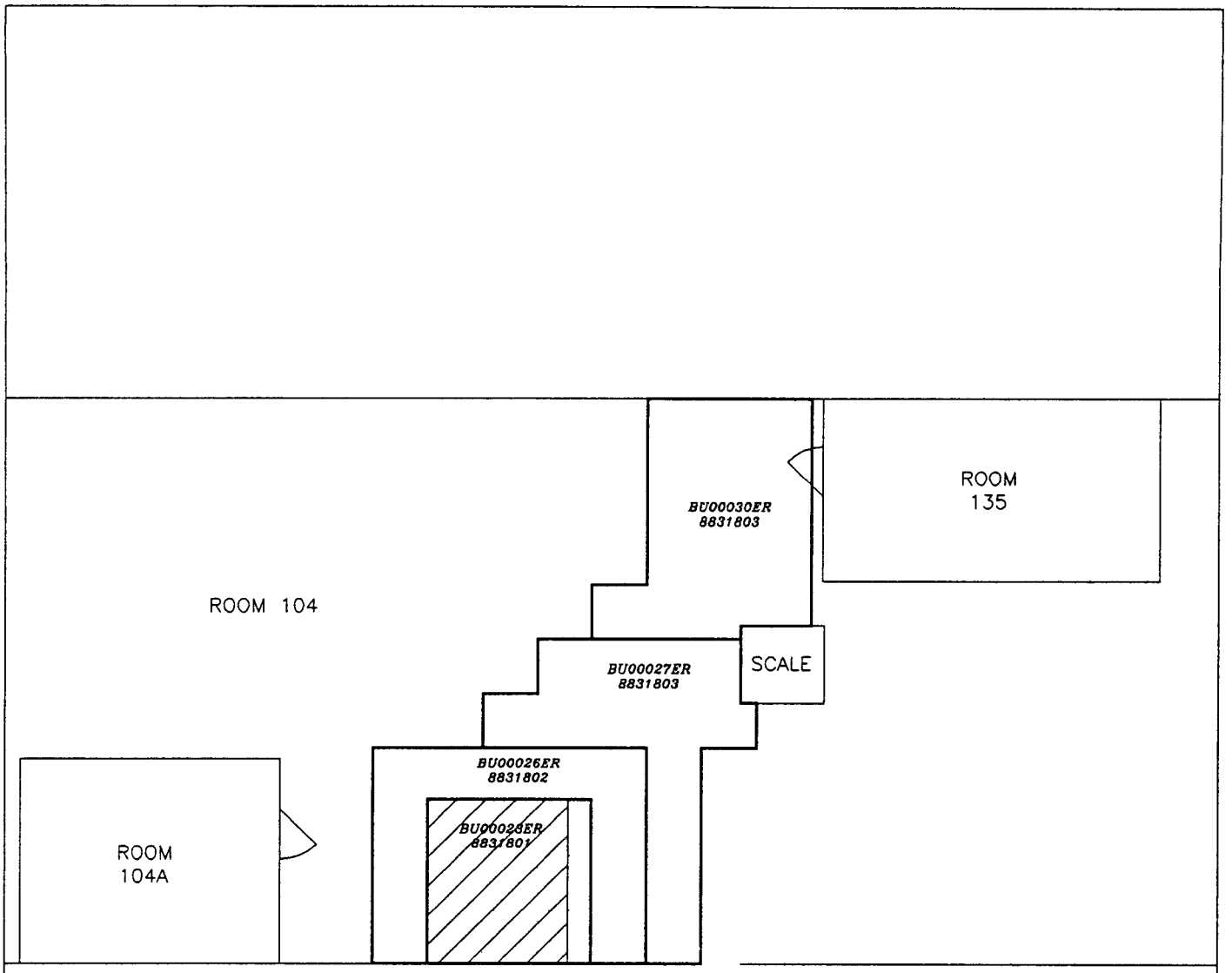
SCALE:	SIZE	DRAWING NUMBER	ISSUE	FIGURE
NONE	B	IHSS 179	A	3-4

865
145



KEYWORDS	A	ORIGINAL ISSUE			XX/XX/93	DAW	SRL	RKT	DLS					
1 OU15	ISSUE	DESCRIPTION			DATE	RFP				DOE	CLASS	JOB NO		
2 PHASE I					U.S. DEPARTMENT OF ENERGY									
3 RFI/RI			DESIGNED	WEAVER	XX/XX/93	ROCKY FLATS AREA OFFICE GOLDEN COLORADO								
4 TECH MEMO			DRAWN	LENNIE	12/20/93	Rocky Flats Plant								
5 NUMBER 1			CHECKED	TERRIEN	XX/XX/93	GOLDEN COLORADO 80401								
BLDG./FACILITY 883			APPROVED	SCHUBBE	XX/XX/93	OU15 PHASE I RFI/RI								
ROOM/AREA 104						IHSS 180 RAD SAMPLE LOCATIONS								
GRID COOR./COL NO.			SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER				ISSUE	FIGURE		
MASTER YES ☐ NO ☒	SCALE NONE		APPROVED RFP			B	IHSS 180				A	3-5		
			APPROVED DOE											

883
104

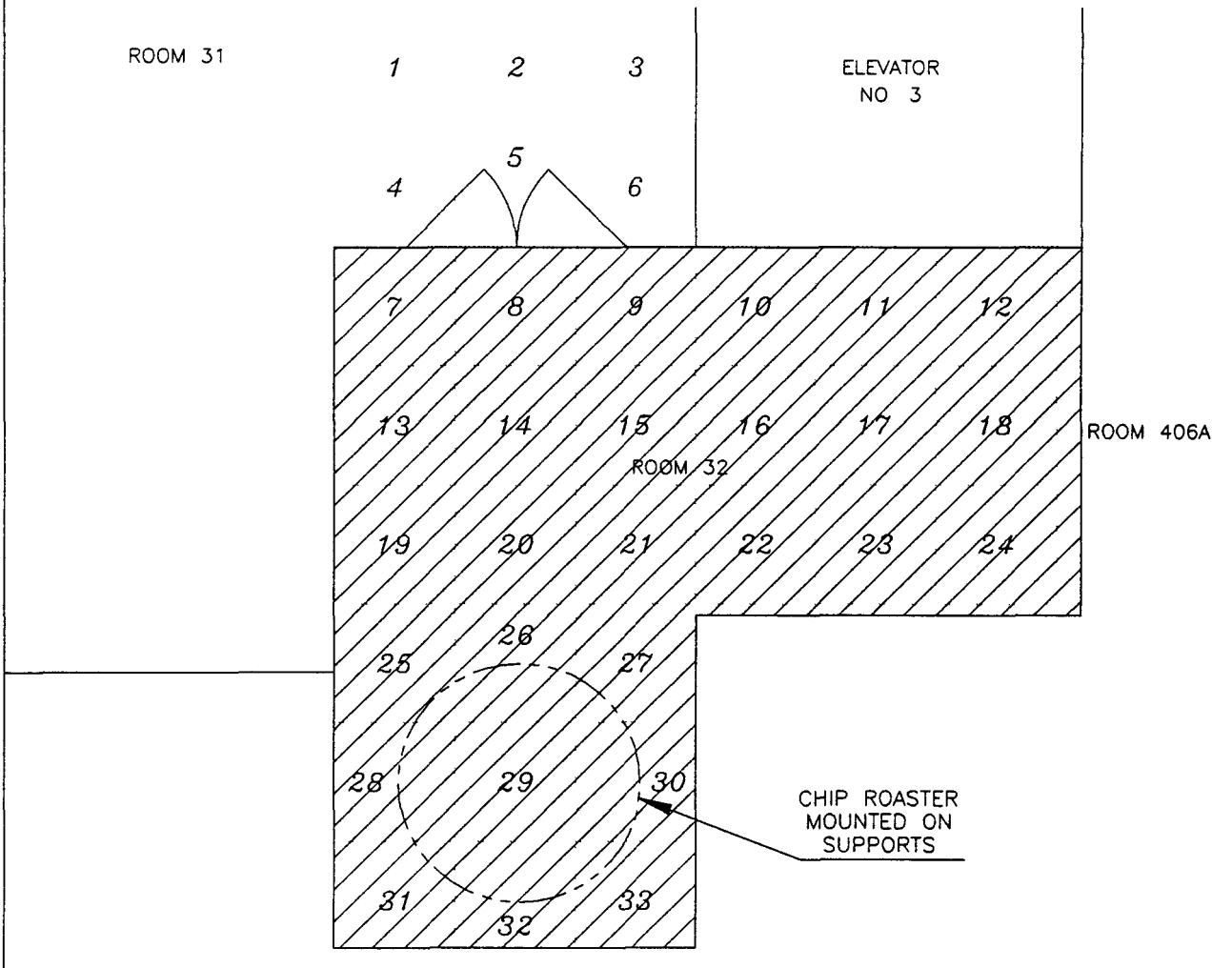


KEYWORDS	A	ORIGINAL ISSUE			XX/XX/93	DAW	SRL	RKT	DLS				
1 OU15	ISSUE	DESCRIPTION			DATE	RFP				DOE	CLASS	JOB NO	
2 PHASE 1					U.S. DEPARTMENT OF ENERGY								
3 RFI/RI		DESIGNED	WEAVER	XX/XX/93	ROCKY FLATS AREA OFFICE GOLDEN COLORADO								
4 TECH MEMO		DRAWN	LENNIE	12/20/93	Rocky Flats Plant								
5 NUMBER 1		CHECKED	TERRIEN	XX/XX/93	GOLDEN COLORADO 80401								
BLDG./FACILITY 883		APPROVED	SCHUBBE	XX/XX/93	OU15 PHASE I RFI/RI								
ROOM/AREA 104					IHSS 180 RINSATE SAMPLE LOCATIONS								
GRID COOR./COL NO.		SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER				ISSUE	FIGURE		
MASTER YES ☐ NO ☒	SCALE NONE	APPROVED REP.			B	IHSS 180				A	3-6		
		APPROVED DOE											

883
104

NOTES

① A SMEAR SAMPLE WAS COLLECTED FROM THE SURFACE OF THE CHIP ROASTER AROUND THE OXIDE OUTLET PORTS



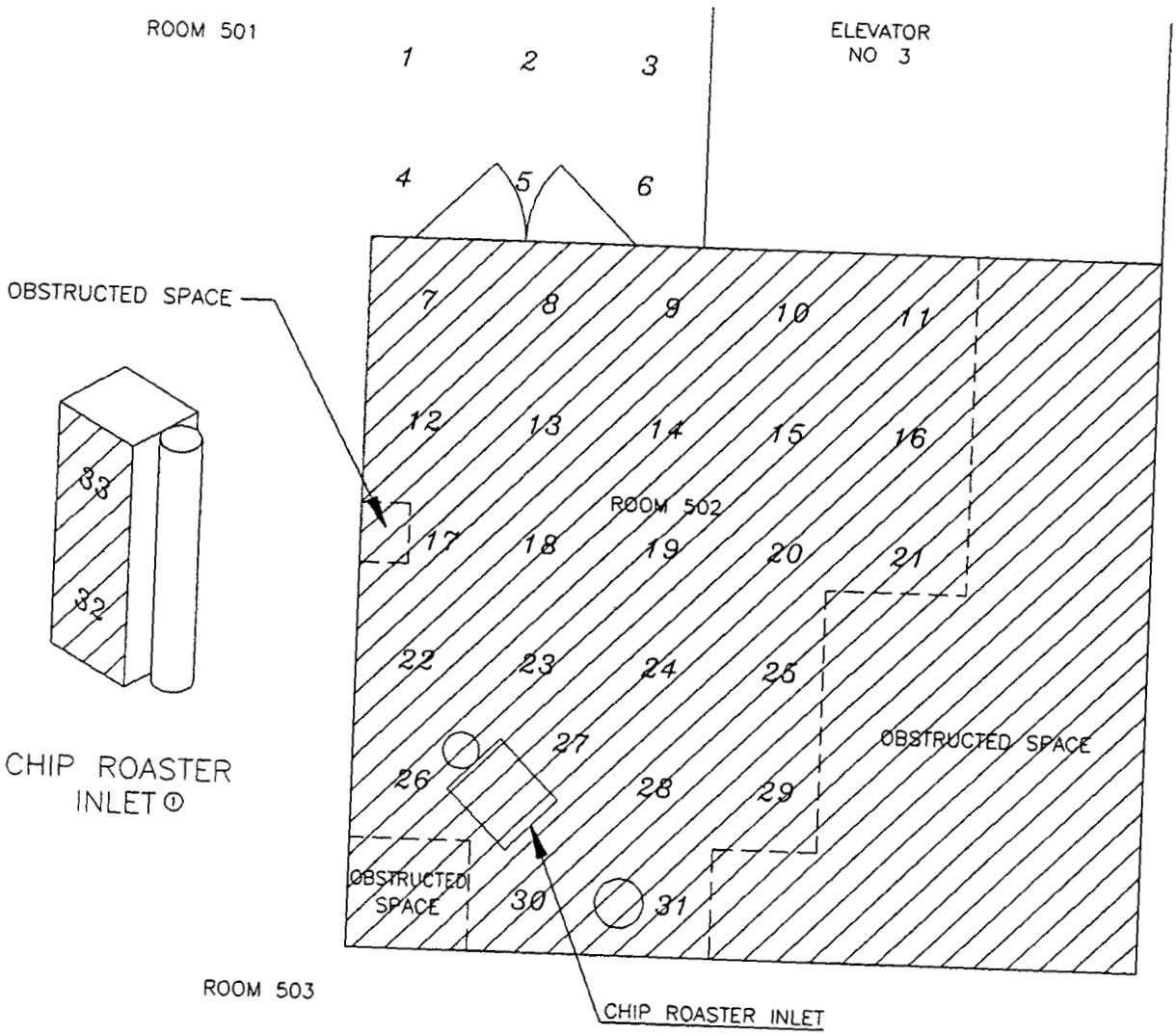
CHIP ROASTER OXIDE OUTLET①

KEYWORDS	A	ORIGINAL ISSUE			XX/XX/93	RCH	SRL	DAW	DLS					
1 OU15	ISSUE	DESCRIPTION			DATE		RFP			DOE	CLASS	JOB NO		
2.PHASE I					U S DEPARTMENT OF ENERGY									
3 RFI/RI		DESIGNED	HEA	XX/XX/93	ROCKY FLATS AREA OFFICE GOLDEN COLORADO									
4 TECH MEMO		DRAWN	LENNIE	12/20/93	Rocky Flats Plant									
5 NUMBER 1		CHECKED	WEAVER	XX/XX/93	GOLDEN COLORADO 80401									
BLDG /FACILITY 447		APPROVED	SCHUBBE	XX/XX/93	OU15 PHASE I RFI/RI									
ROOM/AREA 31/32					IHSS 204 RAD SAMPLE LOCATIONS									
GRID COOR./COL NO.		SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER					ISSUE	FIGURE		
MASTER YES ☐ NO ☒	SCALE: NONE	APPROVED RFP			B	IHSS 204					A	3-7		
		APPROVED DOE												

447
31/32

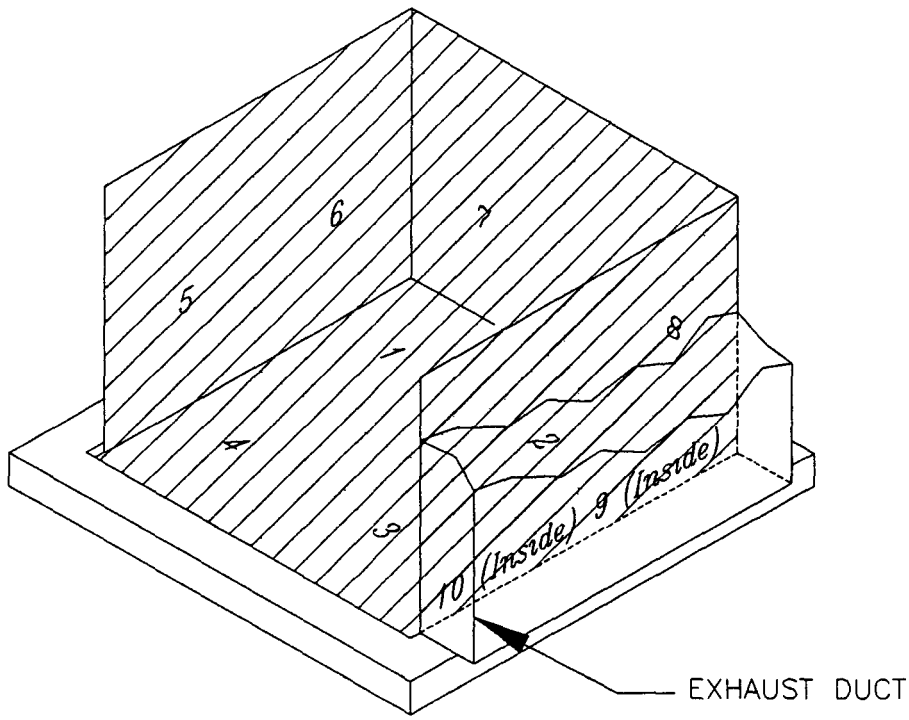
NOTES

① TWO SMEAR SAMPLES WERE COLLECTED FROM THE SURFACE OF THE CHIP ROASTER INLET



KEYWORDS	A	ORIGINAL ISSUE			XX/XX/93	RCH	SRL	DAW	DLS				
1-OU15	ISSUE	DESCRIPTION			DATE	RFP				DOE	CLASS	JOB NO	
2 PHASE I													
3 RFI/RI			DESIGNED	HEA	XX/XX/93	U.S. DEPARTMENT OF ENERGY ROCKY FLATS AREA OFFICE GOLDEN COLORADO							
4 TECH MEMO			DRAWN	LENNIE	XX/XX/93								
5 NUMBER 1			CHECKED	WEAVER	XX/XX/93	Rocky Flats Plant GOLDEN COLORADO 80401							
BLDG./FACILITY 447			APPROVED	SCHUBBE	XX/XX/93								
ROOM/AREA 501/502						OU15 PHASE I RFI/RI							
GRID COOR./COL NO.						IHSS 204 RAD SAMPLE LOCATIONS							
MASTER YES ☐ NO ☒	SCALE. NONE		SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER			ISSUE	FIGURE		
			APPROVED RFP			B	IHSS 204			A	3-8		
			APPROVED DOE										

447
502



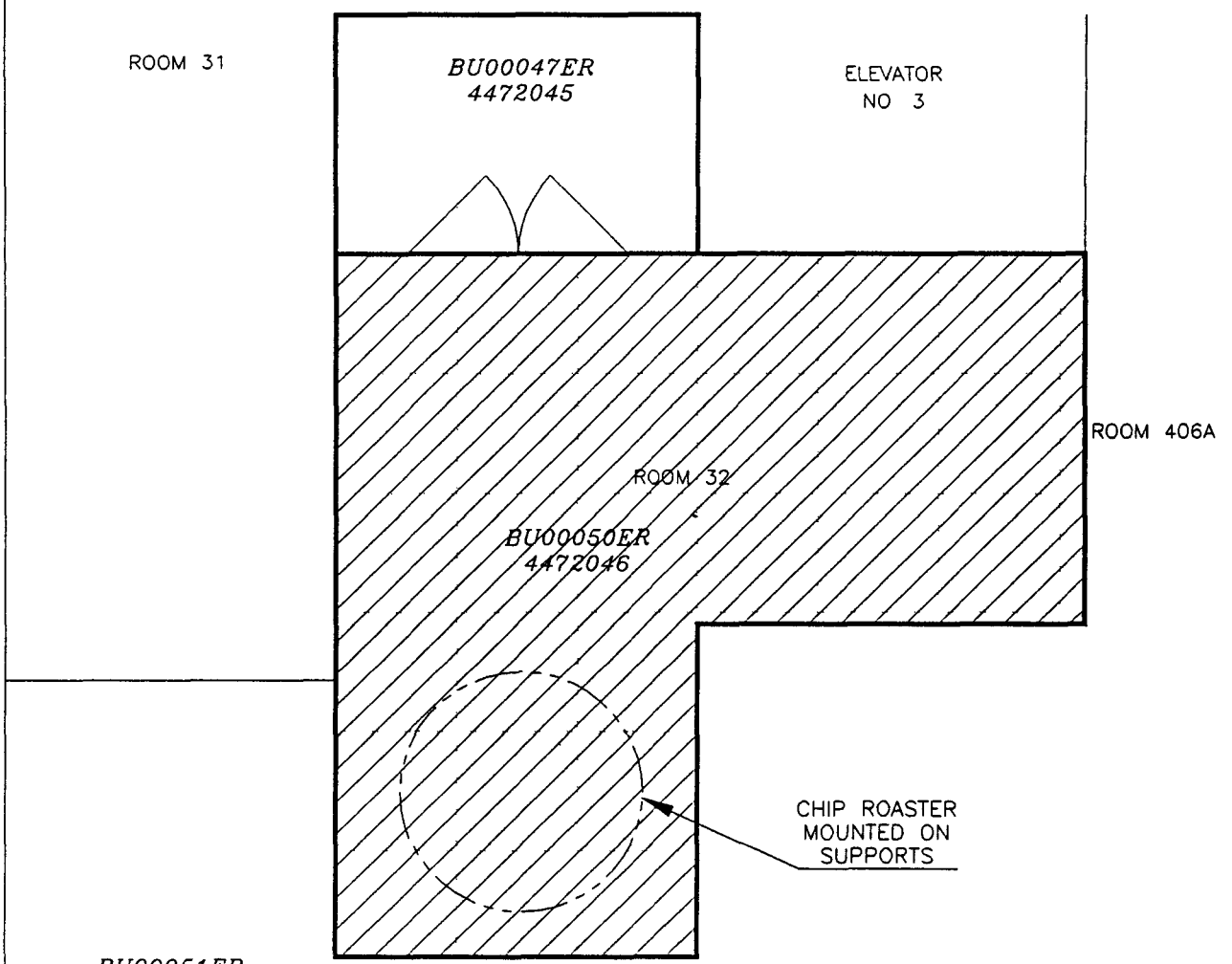
WASH RACK/DRUM WASHING BASIN

KEYWORDS	A	ORIGINAL ISSUE			XX/XX/93	RCH	SRL	DAW	DLS			
1 OU15	ISSUE	DESCRIPTION			DATE		RFP			DOE	CLASS	JOB NO
2 PHASE I			DESIGNED	HEA	XX/XX/93	U.S. DEPARTMENT OF ENERGY						
3 RFI/RI			DRAWN	SCHACKLIN	12/20/93	ROCKY FLATS AREA OFFICE GOLDEN COLORADO						
4 TECH MEMO			CHECKED	WEAVER	XX/XX/93	Rocky Flats Plant						
5 NUMBER 1			APPROVED	SCHUBBE	XX/XX/93	GOLDEN COLORADO 80401						
BLDG /FACILITY 447						OU15 PHASE I RFI/RI						
ROOM/AREA 501						IHSS 204 RAD SAMPLE LOCATIONS						
GRID COOR./COL NO.			SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER			ISSUE	FIGURE	
MASTER YES ☐ NO ☒	SCALE NONE		APPROVED RFP			B	IHSS 204			A	3-9	
			APPROVED DOE									

447
501

NOTES

① A RINSATE SAMPLE WAS COLLECTED FROM THE SURFACE OF THE CHIP ROASTER AROUND THE OXIDE OUTLET PORTS



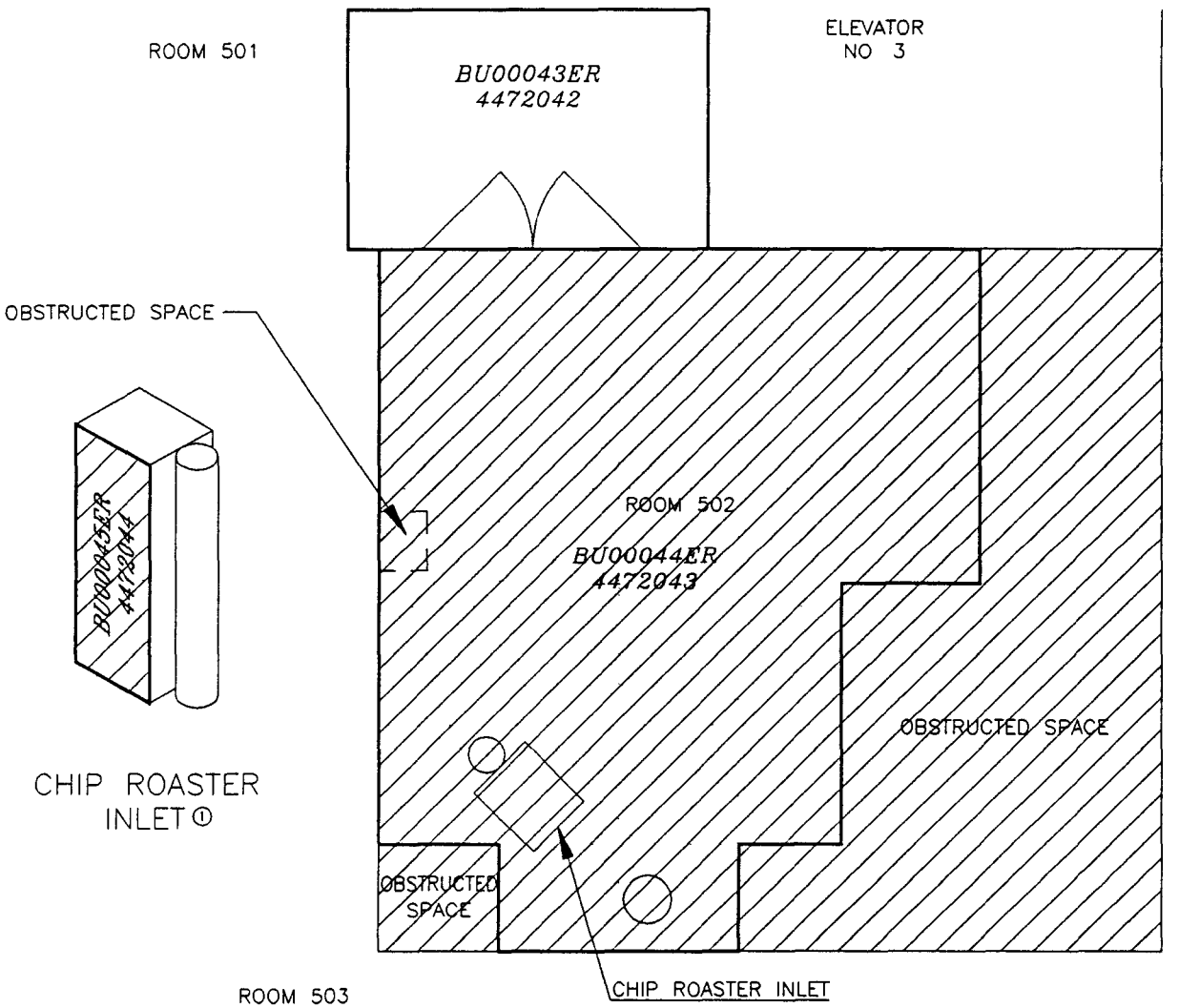
CHIP ROASTER
OXIDE OUTLET①

KEYWORDS	A	ORIGINAL ISSUE			XX/XX/93	RCH	SRL	DAW	DLS			
1 OU15	ISSUE	DESCRIPTION			DATE		RFP			DOE	CLASS	JOB NO
2 PHASE I			DESIGNED	HEA	XX/XX/93	U.S. DEPARTMENT OF ENERGY						
3 RFI/RI			DRAWN	LENNIE	12/20/93	ROCKY FLATS AREA OFFICE GOLDEN COLORADO						
4 TECH MEMO			CHECKED	WEAVER	XX/XX/93	Rocky Flats Plant						
5 NUMBER 1			APPROVED	SCHUBBE	XX/XX/93	GOLDEN COLORADO 80401						
BLDG./FACILITY 447						OU15 PHASE I RFI/RI						
ROOM/AREA 31/32						IHSS 204 RINSATE SAMPLE LOCATIONS						
GRID COOR./COL NO.			SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER			ISSUE	FIGURE	
MASTER YES ☐ NO ☒	SCALE: NONE		APPROVED RFP			B	IHSS 204			A	3-10	
			APPROVED DOE									

447
31/32

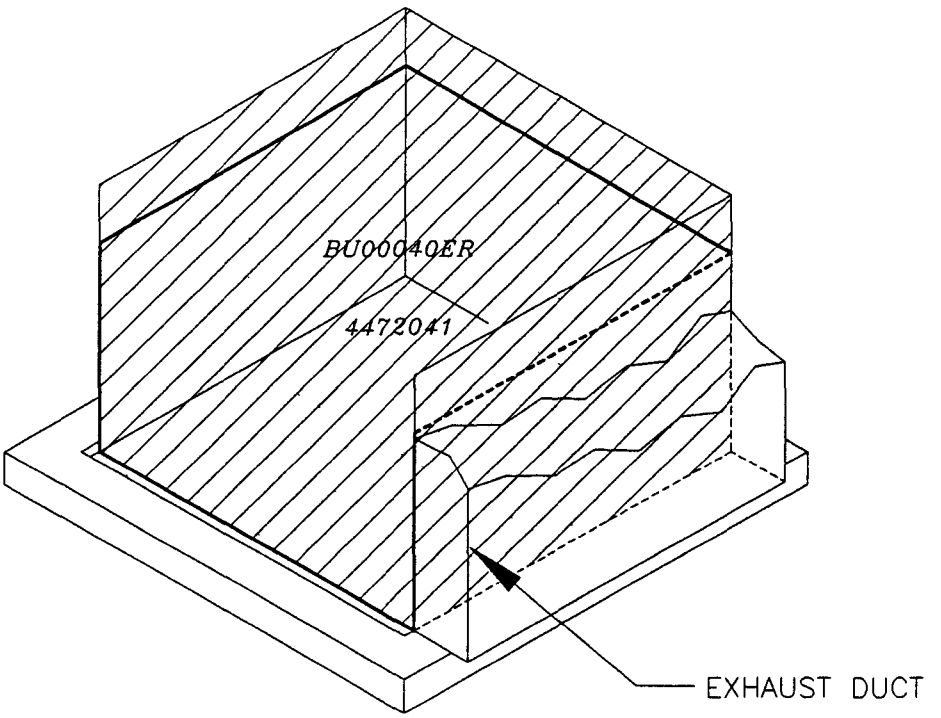
NOTES

① A RINSATE SAMPLE WAS COLLECTED FROM THE SURFACE OF THE CHIP ROASTER INLET



KEYWORDS	A	ORIGINAL ISSUE			XX/XX/93	RCH	SRL	DAW	DLS				
1 OU15	ISSUE	DESCRIPTION			DATE	RFP				DOE	CLASS	JOB NO	
2 PHASE I					U.S. DEPARTMENT OF ENERGY								
3 RFI/RI		DESIGNED	HEA	XX/XX/93	ROCKY FLATS AREA OFFICE GOLDEN COLORADO								
4 TECH MEMO		DRAWN	LENNIE	XX/XX/93	Rocky Flats Plant								
5 NUMBER 1		CHECKED	WEAVER	XX/XX/93	GOLDEN COLORADO 80401								
BLDG./FACILITY 447		APPROVED	SCHUBBE	XX/XX/93	OU15 PHASE I RFI/RI								
ROOM/AREA 501/502					IHSS 204 RINSATE SAMPLE LOCATIONS								
GRID COOR./COL NO.		SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER				ISSUE	FIGURE		
MASTER YES ☐ NO ☒	SCALE NONE	APPROVED RFP			B	IHSS 204				A	3-11		
		APPROVED DOE											

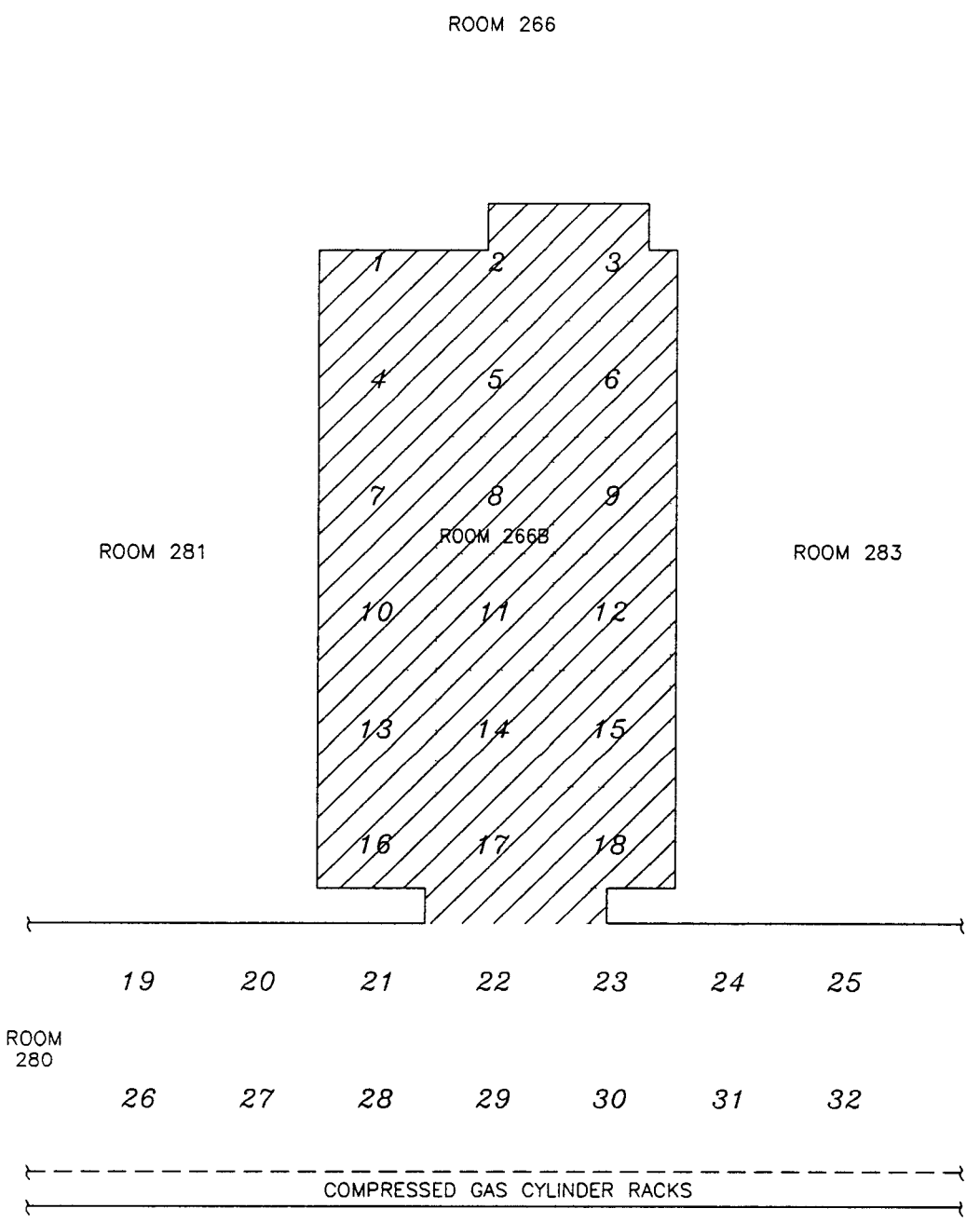
447
502



WASH RACK/DRUM WASHING BASIN

KEYWORDS	A	ORIGINAL ISSUE	XX/XX/93	RCH	SRL	DAW	DLS			
1 OU15	ISSUE	DESCRIPTION	DATE	RFP				DOE	CLASS	JOB NO
2 PHASE I			U S DEPARTMENT OF ENERGY ROCKY FLATS AREA OFFICE GOLDEN COLORADO							
3 RFI/RI		DESIGNED HEA XX/XX/93								
4 TECH MEMO		DRAWN SCHACKLIN 12/20/93	Rocky Flats Plant GOLDEN COLORADO 80401							
5 NUMBER 1		CHECKED WEAVER XX/XX/93								
BLDG /FACILITY 447		APPROVED SCHUBBE XX/XX/93	OU15 PHASE I RFI/RI							
ROOM/AREA 501			IHSS 204 RINSATE SAMPLE LOCATIONS							
GRID COOR./COL NO.		SUBMITTED BIERBAUM XX/XX/93	SIZE	DRAWING NUMBER				ISSUE	FIGURE	
MASTER YES ☐ NO ☒	SCALE NONE	APPROVED RFP / APPROVED DOE	B	IHSS 204				A	3-12	

447
501



KEYWORDS	A	ORIGINAL ISSUE			XX/XX/93	RCH	SRL	PRB	DLS						
1 OU15	ISSUE	DESCRIPTION			DATE		RFP			DOE	CLASS	JOB NO			
2 PHASE I					U S DEPARTMENT OF ENERGY										
3 RFI/RI		DESIGNED	HEA	XX/XX/93	ROCKY FLATS AREA OFFICE GOLDEN COLORADO										
4 TECH MEMO		DRAWN	LENNIE	12/20/93	Rocky Flats Plant										
5 NUMBER 1		CHECKED	BIERBAUM	XX/XX/93	GOLDEN COLORADO 80401										
BLDG./FACILITY 881		APPROVED	SCHUBBE	XX/XX/93	OU15 PHASE I RFI/RI										
ROOM/AREA 2668					IHSS 211 RAD SAMPLE LOCATIONS										
GRID COOR./COL NO.		SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER				ISSUE	FIGURE				
MASTER YES ☐ NO ☒	SCALE NONE	APPROVED RFP			B	IHSS 211				A	3-13				
		APPROVED DOE													

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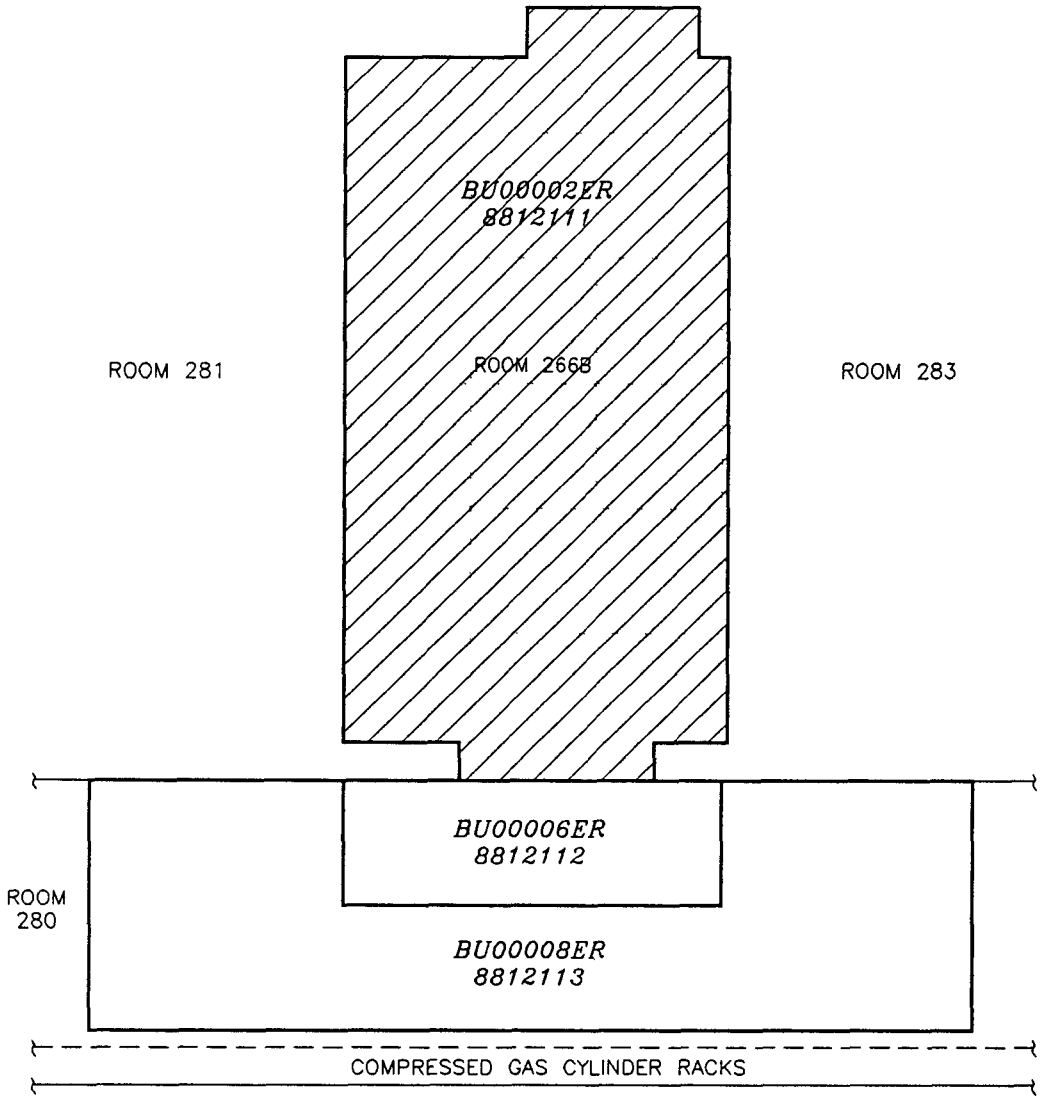
2668



KEYWORDS	ISSUE	DESCRIPTION			DATE	RFP			DOE	CLASS	JOB NO
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2 PHASE I		DESIGNED	HEA	XX/XX/93	U.S. DEPARTMENT OF ENERGY ROCKY FLATS AREA OFFICE GOLDEN,COLORADO						
3 RFI/RI		DRAWN	LENNIE	12/20/93							
4 TECH MEMO		CHECKED	BIERBAUM	XX/XX/93	Rocky Flats Plant						
5 NUMBER 1		APPROVED	SCHUBBE	XX/XX/93	GOLDEN COLORADO 80401						
BLDG./FACILITY 881					OU15 PHASE I RFI/RI						
ROOM/AREA 266B					IHSS 211 RINSATE SAMPLE LOCATIONS						
GRID COOR./COL NO.		SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER			ISSUE	FIGURE	
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		APPROVED DOE									

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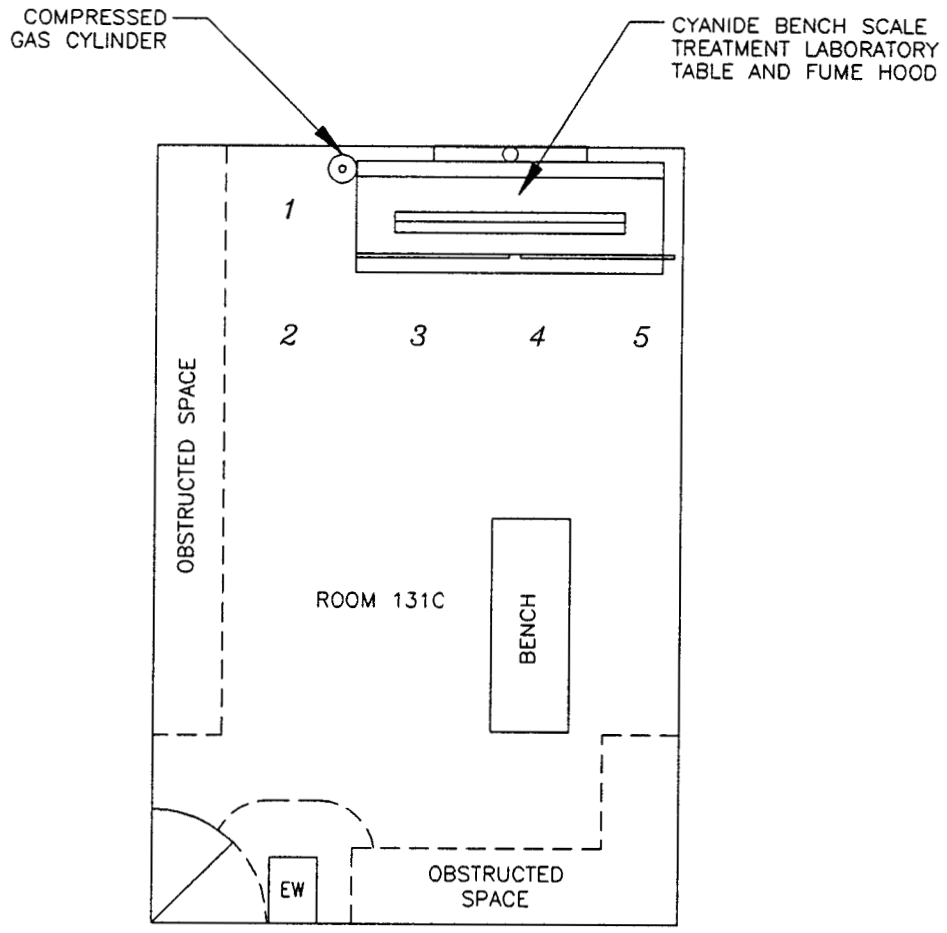
2668



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131C

KEYWORDS	ISSUE	DESCRIPTION	DATE	RFP	DOE	CLASS	JOB NO
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2 PHASE I							
3 RFI/RI							
4 TECH MEMO							
5 NUMBER 1							
BLDG./FACILITY 881							
ROOM/AREA 131C							
GRID COOR./COL NO.							

DESIGNED	HEA	XX/XX/93	
DRAWN	LENNIE	12/20/93	
CHECKED	BIERBAUM	XX/XX/93	
APPROVED	SCHUBBE	XX/XX/93	
SUBMITTED	BIERBAUM	XX/XX/93	

MASTER YES ☐ NO ☒

SCALE: NONE

APPROVED RFP
APPROVED DOE

U S DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN COLORADO

Rocky Flats Plant

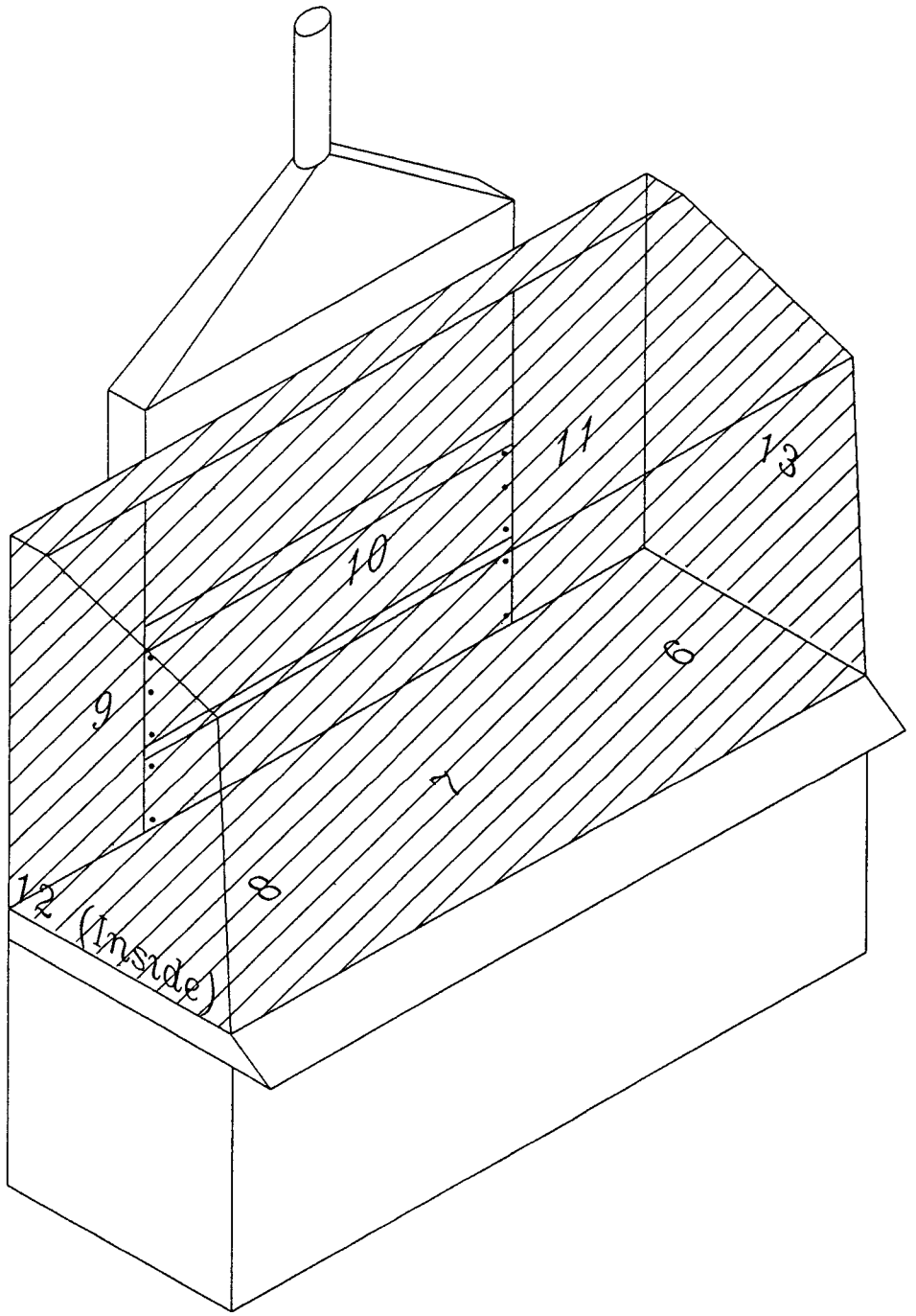
GOLDEN COLORADO 80401

OU15 PHASE I RFI/RI

IHSS 217 RAD SAMPLE LOCATIONS

SIZE	DRAWING NUMBER	ISSUE	FIGURE
B	IHSS 217	A	3-15

CYANIDE BENCH SCALE TREATMENT
LABORATORY TABLE AND FUME HOOD



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2 PHASE I					U S DEPARTMENT OF ENERGY								
3 RFI/RI		DESIGNED	HEA	XX/XX/93	ROCKY FLATS AREA OFFICE GOLDEN COLORADO								
4 TECH MEMO		DRAWN	LENNIE	12/20/93	Rocky Flats Plant								
5 NUMBER 1		CHECKED	BIERBAUM	XX/XX/93	GOLDEN COLORADO 80401								
BLDG./FACILITY 881		APPROVED	SCHUBBE	XX/XX/93	OU15 PHASE I RFI/RI								
ROOM/AREA 131C					IHSS 217 RAD SAMPLE LOCATIONS								
GRID COOR./COL NO.		SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER				ISSUE	FIGURE		
MASTER YES ☐ NO ☒	SCALE NONE	APPROVED RFP			B	IHSS 217				A	3-16		
		APPROVED DOE											

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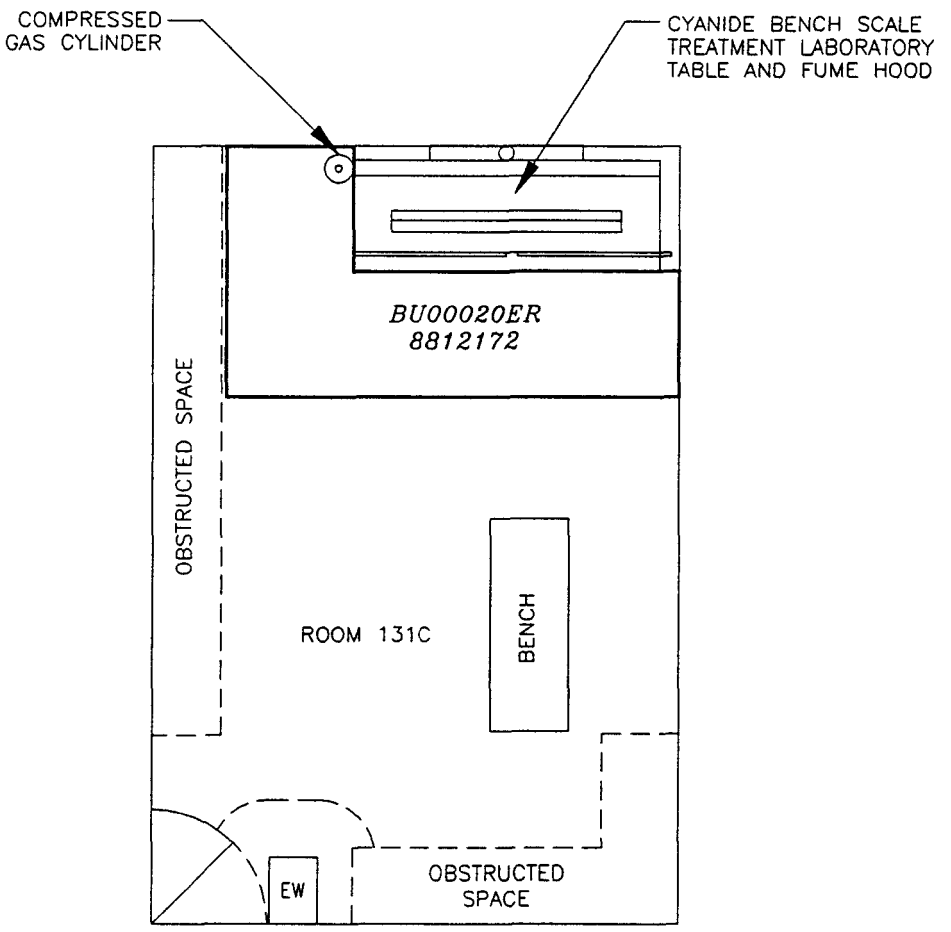
131C



KEYWORDS	ISSUE	DESCRIPTION	DATE	RFP	DOE	CLASS	JOB NO.
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2. PHASE I							
3 RFI/RI							
4 TECH MEMO							
5. NUMBER 1							
BLDG./FACILITY 881							
ROOM/AREA 131C							
GRID COOR./COL NO.							
MASTER YES ☐ NO ☒							

DESIGNED	HEA	XX/XX/93
DRAWN	LENNIE	12/20/93
CHECKED	BIERBAUM	XX/XX/93
APPROVED	SCHUBBE	XX/XX/93
SUBMITTED	BIERBAUM	XX/XX/93
APPROVED RFP		
APPROVED DOE		

SCALE: NONE

U S DEPARTMENT OF ENERGY
ROCKY FLATS AREA OFFICE GOLDEN COLORADO

Rocky Flats Plant
GOLDEN COLORADO 80401

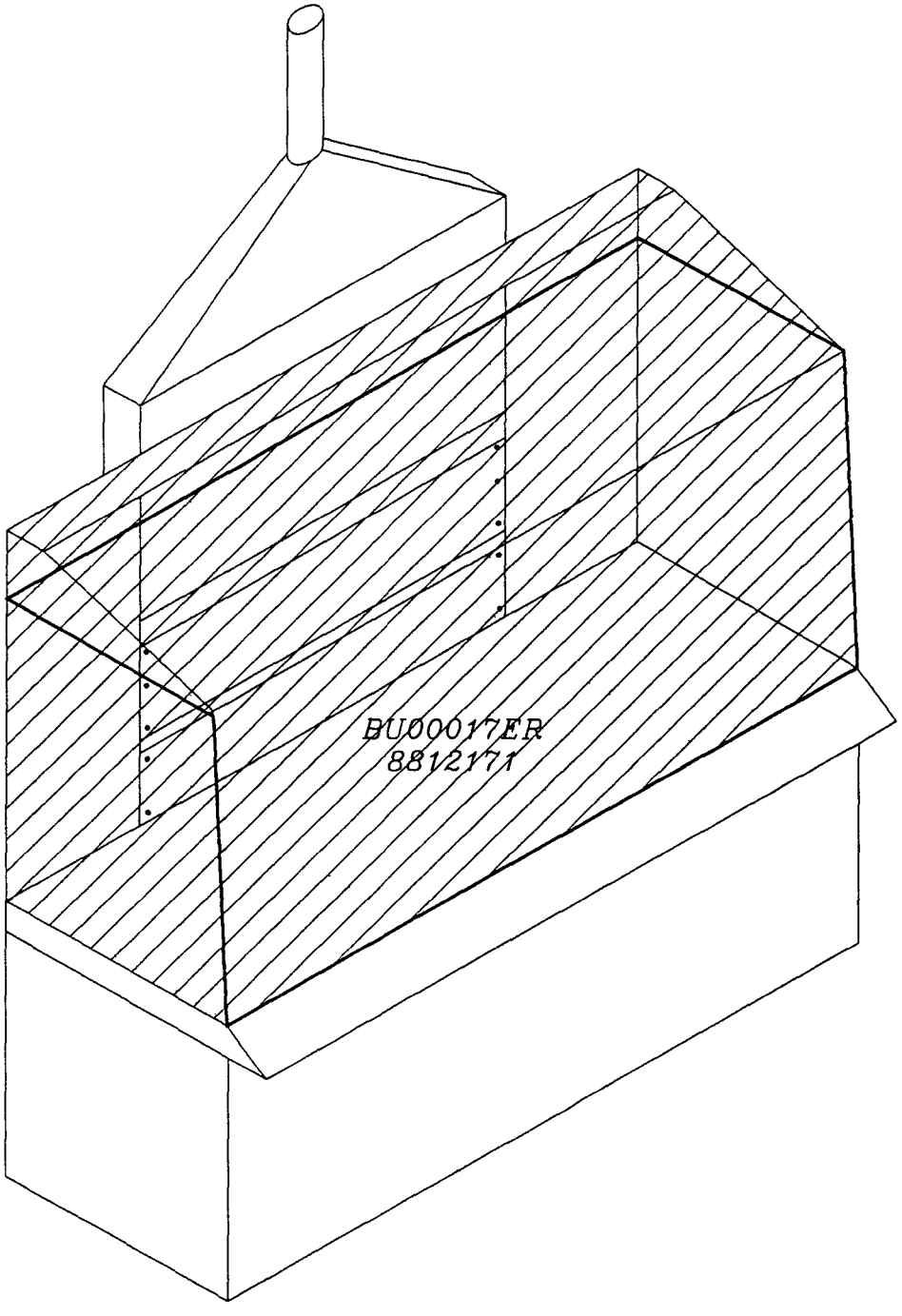
OU15 PHASE I RFI/RI

IHSS 217 RINSATE SAMPLE LOCATIONS

SIZE	DRAWING NUMBER	ISSUE	FIGURE
B	IHSS 217	A	3-17

881
131C

CYANIDE BENCH SCALE TREATMENT LABORATORY TABLE AND FUME HOOD



KEYWORDS	A	ORIGINAL ISSUE			XX/XX/93	RCH	SRL	PRB	DLS				
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2 PHASE I		DESIGNED	HEA	XX/XX/93	U S DEPARTMENT OF ENERGY								
3 RFI/RI		DRAWN	LENNIE	12/20/93	ROCKY FLATS AREA OFFICE GOLDEN COLORADO								
4 TECH MEMO		CHECKED	BIERBAUM	XX/XX/93	Rocky Flats Plant								
5 NUMBER 1		APPROVED	SCHUBBE	XX/XX/93	GOLDEN,COLORADO 80401								
BLDG /FACILITY 881					OU15 PHASE I RFI/RI								
ROOM/AREA 131C					IHSS 217 RINSATE SAMPLE LOCATIONS								
GRID COOR./COL NO		SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER				ISSUE		FIGURE	
MASTER YES ☐ NO ☒	SCALE NONE	APPROVED RFP			B	IHSS 217				A		3-18	
		APPROVED DOE											

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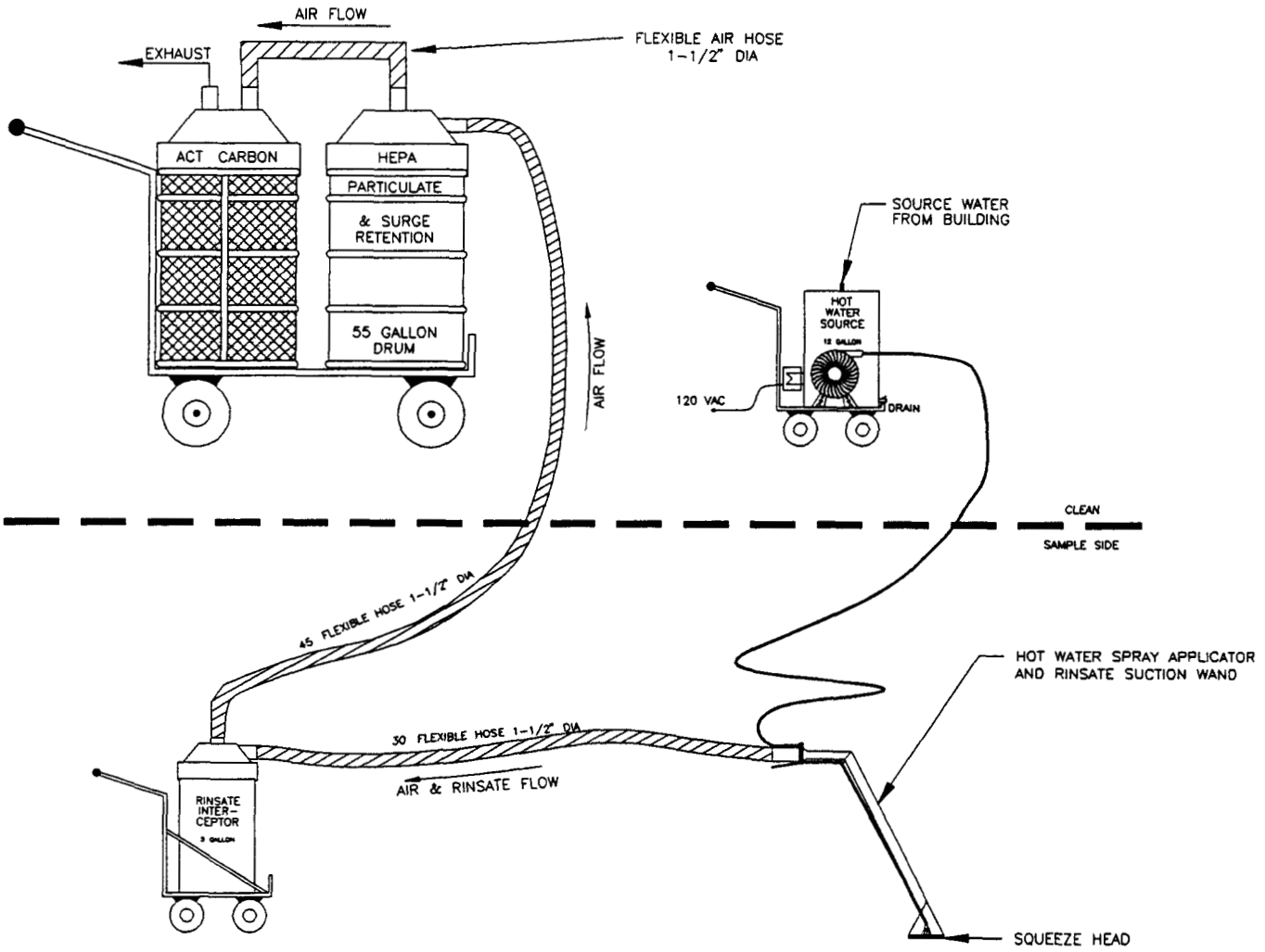
131C



KEYWORDS	A	ORIGINAL ISSUE			XX/XX/93	OSH	SRL	RCH	DLS				
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2 PHASE I		DESIGNED	HINDS	04/01/93	U S DEPARTMENT OF ENERGY								
3 RFI/RI		DRAWN	LENNIE	12/21/93	ROCKY FLATS AREA OFFICE GOLDEN,COLORADO								
4 TECH MEMO		CHECKED	HEA	XX/XX/93	Rocky Flats Plant								
5 NUMBER 1		APPROVED	SCHUBBE	XX/XX/93	GOLDEN COLORADO 80401								
BLDG /FACILITY					OU15 PHASE I RFI/RI								
ROOM/AREA					HOT WATER RINSATE SAMPLING SYSTEM								
GRID COOR./COL NO		SUBMITTED	BIERBAUM	XX/XX/93	SIZE	DRAWING NUMBER				ISSUE	FIGURE		
MASTER YES ☐ NO ☒	SCALE NONE	APPROVED RFP			B					A	3-19		
		APPROVED DOE											

Section 4 0

4.0 *DATA QUALITY EVALUATION*

The Phase I RFI/RI was conducted in accordance with the approved Work Plan, the site-wide Quality Assurance Project Plan (QAPjP), and SOPs as amended by the Work Plan This section addresses the quality and useability of the data collected during the OU15 Phase I RFI/RI to determine if the site-specific objectives were achieved Data Quality Objectives (DQOs) were established in the Work Plan to qualitatively and quantitatively evaluate the useability of the data in terms of precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters Definitions of the codes used in the Section 4 0, 5 0, and 6 0 data tables are included in the Table of Contents

4.1 *Phase I RFI/RI Data Quality Objectives*

The site-specific objectives of the OU15 Phase I RFI/RI were established according to the requirements of the IAG and the OU15 Work Plan The site-specific data quality objectives are described in Section 4 0 of the Work Plan The objectives were achieved by reviewing new and historical information, visually inspecting and documenting current IHSS conditions, and sampling and analyzing surfaces within each IHSS area Table 3-1 in Section 3 0 summarizes field investigation activities completed for the OU15 Phase I RFI/RI Achievement of each site-specific DQO is discussed in the following sections

4.1.1 *Characterize Site Physical Features*

Each IHSS was visually inspected to evaluate site physical features and collect pertinent information regarding the nature, extent, and migration potential of contamination The inspection characterized general building construction, IHSS design, and current condition, and examined floor thickness, slope, drains, coatings (seals/paints), condition, and secondary containment

4.1.2 Define Contaminant Sources

Contaminant sources were defined by identifying and characterizing wastes that were historically stored or processed in each IHSS and by determining the presence or absence of contamination within each IHSS Contaminant source information was collected via a detailed records review In addition, samples were collected inside IHSS boundaries and analyzed for radionuclides, beryllium, TCL volatile organics, TCL semi-volatile organics, and TAL metals

4.1.3 Determine Nature and Extent of Contamination

The nature and extent of contamination was determined by evaluating the spatial distribution of IHSS-related contaminants Spatial distribution was determined by establishing a sampling grid and collecting and analyzing three types of samples including

- surficial smear samples for radionuclide and beryllium analysis,
- hot water rinsate samples for TCL volatile organics, TCL semi-volatile organics, and TAL metals analysis, and
- radiation surveys for fixed radionuclide constituents

In addition, samples were collected from within each IHSS, and from areas around the perimeter and along pathways leading from each IHSS to provide sufficient coverage of the extent of contamination

4.1.4 Describe Contaminant Fate and Transport

Contaminant fate and transport was evaluated by assessing the current condition of secondary containment at each IHSS and assessing the potential contamination migration pathways from each IHSS to the environment outside of the IHSS Information obtained from site inspections, records review, sampling, and analysis were applied in determining the potential for a release, direct release mechanisms, and chemical/radiological gradients from each IHSS

4.1.5 Support a Baseline Risk Assessment

The satisfaction of each of the DQOs will provide support for a BRA, if required Section 300 430(d) of the National Contingency Plan states that as part of the remedial investigation, a BRA is to be conducted to determine whether contaminants of concern identified at the site pose a current or potential future risk to human health and the environment in the absence of remedial action However, the OU15 IHSSs are RCRA closure units and must therefore meet the RCRA clean closure performance standards The clean closure performance standards were defined by reviewing the State RCRA Permit The data were evaluated to determine if the standard was achieved at each IHSS Based on guidance provided in the "Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual, Part A" (EPA, 1989) (RAGS Part A), the following criteria indicate the data suitability for a BRA

- Standard EPA and GRRASP methods were used ensuring an adequate level of data quality assurance
- Detection limits acheived using EPA and GRRASP methods are sufficiently low to support calculations at low risk levels Few samples were diluted due to interference, and the dilution factors necessary were low (generally 2 0)
- The number of samples, locations, and analytes were sufficient to characterize the nature and extent of contamination

- Specific compounds and radionuclides were identified, as opposed to groups of compounds such as Total Petroleum Hydrocarbons, thus allowing for specific compound toxicities to be used
- The data underwent QA/QC scrutiny during the RFEDS process, as well as an evaluation for PARCC parameters provided below

Based on these factors, the data are of sufficient quality to support a BRA, if necessary In addition, the radiological data are of sufficient quality to support a radionuclide-specific dose assessment, if necessary

4.2 Data Useability

The analytical program requirements are based on the DQOs and resulting FSP as defined in the Work Plan, Sections 4 0 and 7 0 To ensure data quality, a quality control program was developed and is described in the Quality Assurance Addendum (QAA) in Section 10 0 of the Work Plan As part of the quality control program for OU15, field QC samples were collected The quality of data collected is measured in terms of PARCC parameters In addition, hot water rinsate blank samples, trip blank samples, and field blank (source water) samples were collected and analyzed to characterize other potential contaminant sources

4.2 1 Quality Control

Four types of QA/QC samples were collected for the hot water rinsate sampling in accordance with the requirements of Section 6 3 of EG&G SOP FO 27 A summary of all individual hot water rinsate and QA/QC samples collected is provided in Table 3-2 (sorted by IHSS) The hot water source or field blanks (taken from the field water source prior to being used for rinsate generation), sample duplicates, equipment rinsate blanks, and trip blanks were analyzed for the same constituents as their associated real samples In Building 881, the same hot water source was used for sampling IHSSs 178,

211 and 217, therefore, only one hot water source sample was collected Since IHSSs 179, 180 and 204 each had a different hot water source, one sample was collected from each source Comparison of the proposed hot water rinsate field QC sampling frequency to the actual hot water rinsate field sampling frequency is presented in Table 4-1

Duplicate samples were collected by the sampling team and were used as a relative measure of the precision of the sample collection process These samples were collected at the same time, using the same procedures, the same equipment, and the same types of containers as required for the real samples They were also preserved in the same manner and submitted for the same analyses as required for the real samples

Equipment rinsate blanks were collected from final decontamination rinsate to evaluate the success of the field sampling team's decontamination efforts on non-dedicated sampling equipment Equipment rinsate blanks were obtained by rinsing cleaned equipment with distilled water prior to sample collection The rinsate was collected and placed in the appropriate sample containers

Trip blanks consisting of distilled water were prepared by a laboratory technician and accompanied each shipment of water samples for VOC analysis Trip blanks were stored with the group of samples with which they were associated Analysis of the trip blanks were used in conjunction with air monitoring data from field activities and other information to assess the influence of ongoing waste operations on the quality of data collected

Hot water rinsate blanks were collected by reproducing the hot water rinsate sampling procedure using distilled water to rinse a clean glass plate The results from these samples were used to identify any contaminants which were attributable to the sampling equipment

4.2.2 PARCC

Precision, accuracy, and completeness are quantitative measures of data quality, while representativeness and comparability are qualitative statements that express the degree to which sample data represent actual conditions and describe the confidence of one data set as compared to another The PARCC parameters are defined in Appendix A of the QAPjP

The analytical data generated using EPA and other well-established methods as identified in the GRRASP and QAPjP, are presented in Sections 5 0 and 6 0 The analytical data were reviewed and validated independently of the laboratory and the sample collection contractor, and the results were documented in data validation reports Standard method-specific data validation procedures developed by EG&G and based on the EPA CLP data validation functional guidelines were used to validate the data

The three classes of data quality used by EG&G are

- V - Valid and usable without qualifications,
- A - Acceptable for use with qualifications, and
- R - Rejected

Other validation codes, as presented in Table 4-2, fall within these three basic categories A list of laboratory qualifiers is also included in Table 4-2 For the purposes of TM#1, valid and acceptable data were considered of equal utility As of March 24, 1994, 43% of all Phase I data have been processed for data validation Of the processed data less than 1% has been rejected

Precision

Precision is a measure of mutual agreement among individual measurements of the same property, under identical conditions Precision is assessed by calculating the relative percent difference (RPD), which is the quotient of the difference between the field (real) and duplicate analytical result and the average of those results for the given analytes expressed as a percentage

$$RPD = \frac{(V_1 - V_2)}{\frac{1}{2}(V_1 + V_2)} * 100\%$$

Where RPD = Relative Percent Difference

V_1, V_2 = the values of the duplicate samples

Field Precision

Field duplicates from the hot water rinsate are collected following the field sample collection using the same sampling technique used for the original or "real" samples Comparison of the data results from the real and duplicate samples provides a measure of the sample homogeneity and sampling technique precision with respect to the amount of error attributed to sampling technique and variability in the analyte concentration in the medium being sampled The field precision objective specified in the QAA is to obtain a RPD of $\leq$ 30% for water samples For metals at concentrations near the quantitation limits, precision is expressed as acceptable if the difference between the real and duplicate results is numerically less than the Contract Required Quantitation Limit (CRQL) or if the RPD criterion is met

In conjunction with the precision objectives outlined in the QAA, the number of duplicate samples required to demonstrate precision was one duplicate pair for every 10 samples collected or 10% of the field samples Table 4-1 lists the achieved field QC sample frequency for the samples collected A list of duplicates and associated field samples (QC partners) is presented by sample number and analyte in Table 4-3 Calculated RPDs are also presented in Table 4-3

Based on the available analytical results, RPDs were calculated for a total of 225 field duplicate pairs and 34 laboratory replicate pairs Overall, a total of 72% of the field duplicates and laboratory replicates analyzed met the field precision goals

Some of the duplicate sample pairs analyzed for radionuclides reported concentrations near the minimum detectable activity (MDA) or were given negative values Reproduceability under these circumstances is difficult because of the analytical limitations and may not reflect poor field precision Therefore, if the CRQL criterion is applied as described for metals, 67% of the radionuclide duplicates achieved the field precision goals

Cyanide, semi-volatile organic, and VOC field duplicate and replicate pairs met the field precision goals in 65% of the samples compared

Metal field duplicate and replicate pairs met the field precision goals in approximately 89% of the samples compared

Based on the stringent goal of $\leq$ 30% RPDs, the degree to which the field duplicate and laboratory replicate data met the goal is sufficient to meet the overall precision objective for the project To overcome any possible bias introduced by analytical error, both real and duplicate results were evaluated separately (rather than averaging the two) such that the maximum possible concentration in each sample was screened

Laboratory Precision

Laboratory precision is evaluated through the use of laboratory duplicates for inorganic analyses and matrix spikes (MS) and matrix spike duplicates (MSD) for the organic analyses Duplicate precision is calculated as RPD, MS/MSD precision is assessed by calculating a RPD between the percent recoveries observed for the method-specific spiked compounds Laboratory precision goals are mandated by the analytical method for each group and assessed for achievement during data validation Data not meeting the precision goals set forth by the method are normally rejected during the RFEDS data validation process

Accuracy

The accuracy of the data obtained in an investigation is a function of the sampling technique, potential for sample contamination during collection and the analytical capabilities of the laboratory Accuracy means the nearness of a result, or the mean of a set of results, to the true value Accuracy is assessed by analysis of reference samples of known concentrations, percent recoveries for spiked samples, and by review of blank data (field equipment, trip, or method blanks) which may have an effect on measurement accuracy

Field Accuracy

Field Accuracy is assessed by comparing sample analyte concentrations to those present in associated field blanks Four types of samples were collected to evaluate field accuracy

- equipment rinsate blanks, which quantify the efficacy of the equipment decontamination procedures and identify any contaminants associated with sample cross-contamination,

- trip blanks, which identify cross-contamination of samples from sources at RFP other than the OU15 IHSSs,
- field blanks (source water), which identify contaminants already present in hot water rinsate source water prior to sample collection, and
- hot water rinsate blanks, which identify any contaminants leaching out of the sampling equipment, and which are therefore artifacts of the sampling method

The results for each of these sample types are given below

Field Accuracy - Equipment Rinsate Blanks

The equipment rinsate blanks are used to monitor for sample cross-contamination and the effectiveness of the decontamination process The blanks are collected by rinsing decontaminated sampling equipment with distilled water, placing the liquid in the appropriate sample container and preserving as is required Table 4-1 presents the proposed and actual frequencies for equipment rinsate sampling relative to the actual number of field samples collected The field QC sample frequency goal is one in 20 or 5% One rinsate sample was collected each day for a total of 9 samples, representing an actual frequency of 40%

Table 4-4 indicates that VOCs, total xylenes, and methylene chloride were detected in the rinsate blanks As noted in the CLP statement of work for organic analyses, these compounds are common laboratory solvents and are often inadvertently introduced into samples from the laboratory atmosphere In accordance with the CLP protocol, the data validators assess whether the occurrence of these compounds is due to laboratory contamination by comparing the sample results to the laboratory blanks Total xylenes were detected in only two samples, BU00013ER and BU00019ER The reported detections were estimated and below the CRQL (data flagged with a J) Methylene

chloride was detected in only two samples, BU00025ER and BU00004ER The reported detections were either estimated and below the CRQL or at the CRQL

Table 4-4 also shows the semi-volatile organic compounds detected in the equipment rinsate blanks Of these samples, bis(2-ethylhexyl)phthalate (DEHP) and hexadecanamide were the only identified semi-volatile organic compounds detected DEHP was detected in four samples, BU00029ER, BU00035ER, BU00042ER, and BU00049ER Two of the reported concentrations were estimated and below the CRQL and the remaining two were within the same order of magnitude as the CRQL Phthalates are a common laboratory contaminant Hexadecanamide was reported at an estimated concentration below the CRQL in only one sample (BU00049ER)

Metals were identified in three of the rinsate blanks (BU00004ER, BU00007ER, and BU00019ER) The metals detected in the rinsate blanks were silicon, calcium, sodium, zinc, cesium, strontium, cadmium, copper, and lead Of these, cadmium was the only metal detected at a concentration above the CRQL The reported cadmium concentration was estimated and acceptable (flagged with a JA)

As presented in Table 4-4, rinsate samples contained Americium-241, Plutonium-239/240, Uranium-233-234, Uranium-235, Uranium-238, Gross α, and Gross β above the CRQL Based on the reported error range of the analytical technique, however, many of these values could fall below the CRQL at the lower end of the estimated range

Overall, the low concentrations of constituents in the equipment rinsate blanks, as compared to the magnitude of concentrations detected in real samples, indicated that the equipment decontamination procedures were adequate and that significant cross-contamination of samples did not occur

Field Accuracy - Trip Blanks

Table 4-5 shows the analytical results for the trip blank samples A total of 8 trip blanks were collected and analyzed Seven of the samples were analyzed only for VOCs The eighth sample was analyzed for VOCs, semi-volatile organic compounds, TAL dissolved metals, and cyanide Table 4-5 indicates that methylene chloride was positively identified in three trip blanks taken from IHSSs 180, 204, and 211 Two of the methylene chloride detections were above the CRQL Methylene chloride is a common laboratory cross-contaminant, and is easily incorporated into a sample erroneously via deposition from air, since methylene chloride is both highly volatile and highly soluble The maximum concentration of methylene chloride detected in the trip blanks was 14 μg/l

Several metals were also detected at low concentrations in sample BU00052ER This sample was the trip blank taken during the hot water rinsate blank sample collection The metals detected above the CRQL were cadmium at 17 6 μg/l, and lead at 4 6 μg/l

Overall, the trip blank results indicated that cross-contamination did not occur from non-related sources during sampling events The only significant exception was methylene chloride, which was either introduced from airborne sources during sampling, or from laboratory cross-contamination during analysis of the trip blanks

Field Accuracy - Field Blanks (Source Water Samples)

Operation of the hot water sampling equipment utilized on-site tap water as the water source for generating the rinsate Contaminants already present in source water were identified by sampling the source water prior to its use for sampling Table 4-6 shows the results of the sample analyses of source water samples In addition, since RFP has

a single domestic water source, additional analytical data on RFP domestic water obtained from the RFP Industrial Hygiene department are also presented in Table 4-6

The results shown in Table 4-6 indicate that several organic and inorganic compounds were present in the source water Those that exceeded the CRQL in one or more of the source water samples were

silicon at 3670 μg/l,
cadmium at 10 8 μg/l,
calcium at 8120 μg/l,
iron at 674 μg/l,
sodium at 6250 μg/l,
bromodichloromethane up to 6 μg/l,
chloroform up to 180 μg/l, and
methylene chloride up to 21 μg/l

The inorganic compounds detected are commonly found in water supplies and are not surprising The detections of bromodichloromethane, chloroform, and methylene chloride may be due to their presence in the source water, or cross-contamination during laboratory analysis Bromodichloromethane and chloroform are more likely to be present in the source water, whereas methylene chloride is more likely to be a laboratory cross-contaminant These organic constituents were not expected at any of the IHSSs, partially due to their volatility and correspondingly short environmental half lives, but also because they were not listed as being part of the waste materials handled at any of the IHSSs Therefore, their presence in source water samples did not interfere significantly with the objectives of the sampling effort to characterize IHSS-related contamination

Field Accuracy - Hot Water Rinsate Blanks

Hot water rinsate blank samples were collected by applying distilled water to a clean glass surface using the hot water rinsate sampling system Table 4-7 shows the analytical

results from these samples At this time, these results have been received only as hard copy, and have not been validated or entered into the RFEDS database

Table 4-7 shows the presence of DEHP in all three of the hot water rinsate blanks The DEHP concentrations ranged from 19 μg/l to 28 μg/l All three of the samples also showed phenol exceeding the calibration range of the analytical instrument The samples were diluted and reanalyzed and showed phenol ranging from 180 μg/l to 380 μg/l

The hot water rinsate blanks also showed the presence of several metals, however, only three were detected above the CRQL These were cadmium at 5 4 μg/l and 11 7 μg/l, lead at 4 1 μg/l and 5 5 μg/l, and zinc at 103 μg/l to 133 μg/l

The presence of cadmium, lead, and zinc is probably attributable to their presence in the distilled source water or in the metal components of the sampling system However, the presence of DEHP and phenol is more clearly linked to leaching of these constituents from the sampling equipment Therefore, these constituents at concentrations similar to those reported above should be considered artifacts of the sampling procedure

Laboratory Accuracy

Accuracy of the laboratory data is assessed through the calculation of the percent recoveries (%R) from MS samples for inorganic analytes, MS/MSD samples for organic analytes, and any in-house or blind certified standard that the laboratory analyzes as part of the required QA/QC program Acceptable accuracy for inorganic MS samples is routinely a recovery of 75% to 125% The %R for the organic MS/MSD analyses is mandated by analytical methods for the specific spiked compounds Acceptable accuracy of the in-house standards is a recovery of 80% and 120% Use of method blanks analyses in the laboratory also assist in analytical accuracy All these measurements are

evaluated during the RFEDS data validation process When analytical accuracy goals are not achieved, data are normally rejected

Evaluation of the validation qualifiers cited for data rejection are summarized in Table 4-2 Rejection of data can often be associated with accuracy problems However, as discussed in the validation section, less than 1% of the validated data has been rejected, which suggests that accuracy is not a significant problem with the presently validated data set

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic(s) of a population, parameter variations at a sampling point, or an environmental condition Representativeness is a qualitative parameter that is most concerned with proper network design, sampling locations, and sampling methods

Representativeness of the sources of contamination in OU15 IHSSs is supported by the extensiveness of the Phase I RFI/RI sampling effort in characterizing the investigation area Representativeness is considered in project planning and supported by the Work Plan, QAA, and associated SOPs The Work Plan was designed based on the results of the previous investigations and on the DQOs identified The sampling activities were designed and conducted to define the existing sources of contamination present in OU15 The plans and procedures are reviewed and approved by appropriate technical and agency representatives As a result, sampling design for the Phase I RFI/RI is assumed to be representative of site conditions

Comparability

Comparability is used to express the confidence with which one set of data can be compared to another set Comparability is promoted by using similar sampling and analytical methods and reporting data in uniform units To achieve comparability for the Phase I RFI/RI data, all analyses and sampling techniques prescribed in the Work Plan are EPA accepted or equivalent methods The data are reported in uniform units for each method and media A demonstration of the comparability of the data is the general consistency in the results between the various sample locations within each IHSS as well as between different IHSSs

Completeness

The objective of completeness is that the investigation provides enough planned data such that the objectives of the project are met Completeness for the Phase I RFI/RI is evaluated by comparing the planned number to the actual number of samples collected and analyzed The analytical results should be validated and deemed valid or acceptable to be considered in an assessment of completeness The overall completeness goal for the Phase I RFI/RI is 90%

Completeness of the data set at the time of the preparation of this report is affected by the 57% of data not yet validated As indicated above, the unvalidated data is still incorporated into the determination of the contaminant source definitions, thereby reducing the significance of this factor in the completeness determination

As shown on Tables 3-1 and 3-2, the Phase I RFI/RI data set was to consist of a specific number of samples for each sample type for each IHSS Based on a comparison with the actual work completed, the Phase I RFI/RI data exceeded the completeness criteria of 90%

Table 4-1
Comparison of Proposed to Actual
Hot Water Rinsate QC Sample Frequency

Sample Type	*Proposed Frequency*	*Actual Frequency*
Duplicates[1]	1/10 or 10%	9/22 or 40%
Field Blanks	One per source	4/4 or 100%
Equipment Rinsate Blanks[2]	1/20 or 5%	9/22 or 40%
Trip Blanks	1/20 or 5%	7/22 or 32%

NA = Not Applicable
NR = Not Required
1/10 = one QC sample per ten samples collected

1 Duplicate samples were to be collected at a minimum of 1/10 or once per day of sampling, whichever was more frequent

2 Equipment rinsate blanks were to be collected at a minimum of 1/20 or once per day of sampling, whichever was more frequent

Table 4-2
Laboratory Qualifiers and Validation Codes

LAB QUAL	DESCRIPTION
*	Outside contract required QC limits - organic
*	DUP analysis outside control limits - inorganic
+	MSA correlation coeffecient less than 0 995 - inorganic
A	TIC suspected aldol-conden product - organic
B	Analyte found in blank and sample - organic
B	Less than method detection limit but greater than or equal to instrument detection limit -inorganic
C	Pesticide where I D confirmed by GC/MS - organic
D	Compounds identified using secondary dilution factor - organic
D	No surrogate/matrix spike recovery, extract diluted
E	Concentration exceeds calibration range of instrument - organic
E	Estimated due to interference - inorganic
F	Estimated, compound off-scale in both columns - organic
G	Native analyte greater than 4 times spike added - inorganic
I	Interference
J	Estimated value less than sample's detection limit
K	Result is between the IDL and MDL (CRDL)
M	Duplication injection precision not met - inorganic
N	Spiked recovery not within control limits - inorganic
S	Determined by MSA, can't be with + or W - inorganic
T	Compound found in TCLP extract blank and sample
U	Undetected, analyzed for but not detected
W	Post-digestion spike outside of control limit - inorganic
X	Lab software flag, entered manually - organic
X	Detection limit greater than normal, sample matrix interference - inorganic
X	Result by calculation - GRRASP
Y	Indistinguishable isomer in TIC - organic
Z	Questionable identification, matrix interference of columns - organic

VAL CODE	DESCRIPTION
	Indicates the record was not validated
A	Data is acceptable, with qualifications
B	Indicates compund was found in blank and sample
E	Associated value exceeds calibration range, dilute and reanalyze
J	Associated value is estimated quantity
JA	Estimated, acceptable
R	Data is rejected
U	Analyzed, not detected at or above method detection limit
V	Data is valid
VA	Data is valid, acceptable with qualifications
Y	Analytical results in validation process
Z	Validation was not requested or performed

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
178	BU00011ER	REAL		BNACLP	TRG	BENZOIC ACID	65			50	JA	
178	BU00012ER	DUP	BU00011ER	BNACLP	TRG	BENZOIC ACID	79			50	JA	19 4%
178	BU00011ER	REAL		BNACLP	TRG	BENZYL ALCOHOL	5		J	10	A	
178	BU00012ER	DUP	BU00011ER	BNACLP	TRG	BENZYL ALCOHOL	7		J	10	A	33 3%
178	BU00011ER	REAL		BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	140			10	JA	
178	BU00012ER	DUP	BU00011ER	BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	160			10	JA	13 3%
178	BU00011ER	REAL		BNACLP	TRG	BUTYL BENZYL PHTHALATE	38			10	JA	
178	BU00012ER	DUP	BU00011ER	BNACLP	TRG	BUTYL BENZYL PHTHALATE	51			10	JA	29 2%
178	BU00011ER	REAL		BNACLP	TRG	DI-n-BUTYL PHTHALATE	13			10	V	
178	BU00012ER	DUP	BU00011ER	BNACLP	TRG	DI-n-BUTYL PHTHALATE	17			10	V	26 7%
178	BU00011ER	REAL		BNACLP	TRG	DI-n-OCTYL PHTHALATE	6		J	10	A	
178	BU00012ER	DUP	BU00011ER	BNACLP	TRG	DI-n-OCTYL PHTHALATE	8		J	10	A	28 6%
178	BU00011ER	REAL		BNACLP	TRG	DIETHYL PHTHALATE	3		J	10	A	
178	BU00012ER	DUP	BU00011ER	BNACLP	TRG	DIETHYL PHTHALATE	3		J	10	A	0 0%
178	BU00011ER	REAL		BNACLP	TRG	PHENOL	45			10	V	
178	BU00012ER	DUP	BU00011ER	BNACLP	TRG	PHENOL	65			10	V	36 4%
178	BU00011ER	REAL		DRADS	TRG	GROSS ALPHA	7 9	1 2		0 82	V	
178	BU00012ER	DUP	BU00011ER	DRADS	TRG	GROSS ALPHA	8 7	1 3		0 69	V	9 6%
178	BU00011ER	REAL		DRADS	REP	GROSS ALPHA	7 9	1 3		0 87	V	0 0%
178	BU00011ER	REAL		DRADS	TRG	GROSS BETA	11	4 0		5 5	V	
178	BU00012ER	DUP	BU00011ER	DRADS	TRG	GROSS BETA	17	4 1		5 1	V	42 9%
178	BU00011ER	REAL		DRADS	REP	GROSS BETA	17	4 3		5 6	V	42 9%
178	BU00011ER	REAL		DRADS	TRG	PLUTONIUM-239/240	023	0 012	B	0 009	V	
178	BU00012ER	DUP	BU00011ER	DRADS	TRG	PLUTONIUM-239/240	024	0 012	B	0 007	V	4 3%
178	BU00011ER	REAL		DRADS	TRG	RADIUM-226	37	0 18	BJ	0 26	A	
178	BU00012ER	DUP	BU00011ER	DRADS	TRG	RADIUM-226	49	0 14	BJ	0 14	A	27 9%
178	BU00011ER	REAL		DRADS	TRG	URANIUM-233,-234	9 3	1 7	B	0 11	A	
178	BU00012ER	DUP	BU00011ER	DRADS	TRG	URANIUM-233,-234	9 6	1 8	B	0 037	A	3 2%
178	BU00011ER	REAL		DRADS	TRG	URANIUM-235	22	0 20	J	0 036	A	
178	BU00012ER	DUP	BU00011ER	DRADS	TRG	URANIUM-235	44	0 29	J	0 063	A	66 7%
178	BU00011ER	REAL		DRADS	TRG	URANIUM-238	1	0 44	B	0 061	A	

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
178	BU00012ER	DUP	BU00011ER	DRADS	TRG	URANIUM-238	1 2	0 50	B	0 063	A	18 2%
178	BU00011ER	REAL		VOACLP	TRG	CHLOROFORM	3		J	5	A	
178	BU00012ER	DUP	BU00011ER	VOACLP	TRG	CHLOROFORM	2		J	5	A	-40 0%
179	BU00033ER	REAL		BNACLP	DIL	2-Pyrrolidinone, 1-methyl-	64		J		Y	
179	BU00033ER	REAL		BNACLP	TRG	4,4'-ISOPROPYLIDENEDIPHENOL	71		J		Y	
179	BU00034ER	DUP	BU00033ER	BNACLP	TRG	4,4'-ISOPROPYLIDENEDIPHENOL	71		J		Y	0 0%
179	BU00033ER	REAL		BNACLP	TRG	BENZOIC ACID	48		U	50	Y	
179	BU00034ER	DUP	BU00033ER	BNACLP	TRG	BENZOIC ACID	21		J	50	Y	-78 3%
179	BU00033ER	REAL		BNACLP	TRG	BENZYL ALCOHOL	2		J	10	Y	
179	BU00034ER	DUP	BU00033ER	BNACLP	TRG	BENZYL ALCOHOL	10		U	10	Y	133 3%
179	BU00033ER	REAL		BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	470		E	10	Y	
179	BU00034ER	DUP	BU00033ER	BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	490		E	10	Y	4 2%
179	BU00033ER	REAL		BNACLP	DIL	BIS(2-ETHYLHEXYL)PHTHALATE	720		D	10	Y	
179	BU00034ER	DUP	BU00033ER	BNACLP	DIL	BIS(2-ETHYLHEXYL)PHTHALATE	670		D	10	Y	-7 2%
179	BU00033ER	REAL		BNACLP	TRG	BUTYL BENZYL PHTHALATE	5		J	10	Y	
179	BU00034ER	DUP	BU00033ER	BNACLP	TRG	BUTYL BENZYL PHTHALATE	4		J	10	Y	-22 2%
179	BU00033ER	REAL		BNACLP	TRG	DI-n-OCTYL PHTHALATE	30			10	Y	
179	BU00034ER	DUP	BU00033ER	BNACLP	TRG	DI-n-OCTYL PHTHALATE	29			10	Y	-3 4%
179	BU00033ER	REAL		BNACLP	DIL	DI-n-OCTYL PHTHALATE	24		DJ	10	Y	
179	BU00034ER	DUP	BU00033ER	BNACLP	DIL	DI-n-OCTYL PHTHALATE	33		DJ	10	Y	31 6%
179	BU00033ER	REAL		BNACLP	TRG	DIETHYL PHTHALATE	3		J	10	Y	
179	BU00034ER	DUP	BU00033ER	BNACLP	TRG	DIETHYL PHTHALATE	10		U	10	Y	107 7%
179	BU00033ER	REAL		BNACLP	TRG	PHENOL	78			10	Y	
179	BU00034ER	DUP	BU00033ER	BNACLP	TRG	PHENOL	95			10	Y	19 7%
179	BU00033ER	REAL		BNACLP	DIL	PHENOL	90		DJ	10	Y	
179	BU00034ER	DUP	BU00033ER	BNACLP	DIL	PHENOL	90		DJ	10	Y	0 0%
179	BU00033ER	REAL		BNACLP	TRG	Phenol, 4,4'-(1-methylethyli	71		J		Y	
179	BU00034ER	DUP	BU00033ER	BNACLP	TRG	Phenol, 4,4'-(1-methylethyli	71		J		Y	0 0%
179	BU00033ER	REAL		DRADS	TRG	AMERICIUM-241	0 007	0 004	J	0 001	V	
179	BU00034ER	DUP	BU00033ER	DRADS	TRG	AMERICIUM-241	0 007	0 004	J	0 001	V	0 0%
179	BU00033ER	REAL		DRADS	TRG	GROSS ALPHA	18	1 3		0 51	V	

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
179	BU00034ER	DUP	BU00033ER	DRADS	TRG	GROSS ALPHA	17	1 2		0 56	V	-5 7%
179	BU00033ER	REAL		DRADS	TRG	GROSS BETA	27	2 8		2 5	V	
179	BU00034ER	DUP	BU00033ER	DRADS	TRG	GROSS BETA	25	2 7		2 3	V	-7 7%
179	BU00033ER	REAL		DRADS	TRG	PLUTONIUM-239/240	0 005	0 004	J	0 005	V	
179	BU00034ER	DUP	BU00033ER	DRADS	TRG	PLUTONIUM-239/240	0 015	0 008		0 007	V	100 0%
179	BU00033ER	REAL		DRADS	TRG	RADIUM-226	86	0 050	B	0 040	A	
179	BU00034ER	DUP	BU00033ER	DRADS	TRG	RADIUM-226	66	0 050	B	0 070	A	-26 3%
179	BU00033ER	REAL		DRADS	TRG	URANIUM-233,-234	3 0	0 79	B	0 12	A	
179	BU00034ER	DUP	BU00033ER	DRADS	TRG	URANIUM-233,-234	3 3	0 94	B	0 13	A	9 5%
179	BU00033ER	REAL		DRADS	TRG	URANIUM-235	0 17	0 17	BJ	0 035	A	
179	BU00034ER	DUP	BU00033ER	DRADS	TRG	URANIUM-235	0 31	0 26	BJ	0 043	A	58 3%
179	BU00033ER	REAL		DRADS	TRG	URANIUM-238	19	2 9	B	0 062	A	
179	BU00034ER	DUP	BU00033ER	DRADS	TRG	URANIUM-238	16	2 8	B	0 15	A	-17 1%
180	BU00023ER	REAL		BNACLP	TRG	1,3-ISOBENZOFURANDIONE	29		J		Y	
180	BU00024ER	DUP	BU00023ER	BNACLP	DIL	1,3-ISOBENZOFURANDIONE	29		J		Y	0 0%
180	BU00023ER	REAL		BNACLP	TRG	2-Pyrrolidinone, 1-methyl-	37		J		Y	
180	BU00024ER	DUP	BU00023ER	BNACLP	DIL	2-Pyrrolidinone, 1-methyl-	36		J		Y	-2 7%
180	BU00023ER	REAL		BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	150			10	Y	
180	BU00024ER	DUP	BU00023ER	BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	190		E	10	Y	23 5%
180	BU00024ER	DUP	BU00023ER	BNACLP	DIL	BIS(2-ETHYLHEXYL)PHTHALATE	230		D	10	Y	42 1%
180	BU00024ER	DUP	BU00023ER	BNACLP	TRG	DI-n-OCTYL PHTHALATE	7		J	10	Y	200 0%
180	BU00024ER	DUP	BU00023ER	BNACLP	DIL	DI-n-OCTYL PHTHALATE	15		DJ	10	Y	200 0%
180	BU00023ER	REAL		BNACLP	TRG	N-METHYLPYRROLIDONE	37		J		Y	
180	BU00024ER	DUP	BU00023ER	BNACLP	DIL	N-METHYLPYRROLIDONE	36		J		Y	-2 7%
180	BU00023ER	REAL		BNACLP	TRG	PHENOL	47			10	Y	
180	BU00024ER	DUP	BU00023ER	BNACLP	TRG	PHENOL	47			10	Y	0 0%
180	BU00024ER	DUP	BU00023ER	BNACLP	DIL	PHENOL	47		D	10	Y	0 0%
180	BU00023ER	REAL		DRADS	TRG	AMERICIUM-241	0 008	0 006	J	0 002	V	
180	BU00024ER	DUP	BU00023ER	DRADS	TRG	AMERICIUM-241	0	003	U	0 009	V	-200 0%
180	BU00023ER	REAL		DRADS	TRG	GROSS ALPHA	50	1 9		0 34	V	

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
180	BU00024ER	DUP	BU00023ER	DRADS	TRG	GROSS ALPHA	50	1 9		0 42	V	0 0%
180	BU00023ER	REAL		DRADS	TRG	GROSS BETA	55	3 7		2 6	V	
180	BU00024ER	DUP	BU00023ER	DRADS	TRG	GROSS BETA	68	4 0		2 5	V	21 1%
180	BU00023ER	REAL		DRADS	TRG	PLUTONIUM-239/240	0 005	0 006	J	0 004	V	
180	BU00024ER	DUP	BU00023ER	DRADS	TRG	PLUTONIUM-239/240	0 007	0 006	J	0 002	V	33 3%
180	BU00023ER	REAL		DRADS	TRG	RADIUM-226	57	0 080	B	0 11	A	
180	BU00024ER	DUP	BU00023ER	DRADS	TRG	RADIUM-226	28	0 080	BJ	0 12	A	-68 2%
180	BU00023ER	REAL		DRADS	REP	RADIUM-226	0 46	0 090	BJ	0 12	A	-21 4%
180	BU00023ER	REAL		DRADS	TRG	URANIUM-233,-234	12	1 9	B	0 056	A	
180	BU00024ER	DUP	BU00023ER	DRADS	TRG	URANIUM-233,-234	11	2 2	B	0 13	A	-8 7%
180	BU00023ER	REAL		DRADS	TRG	URANIUM-235	0 30	0 22	BJ	0 031	A	
180	BU00024ER	DUP	BU00023ER	DRADS	TRG	URANIUM-235	1 2	0 53		0 13	A	120 0%
180	BU00023ER	REAL		DRADS	TRG	URANIUM-238	58	7 3	B	0 031	A	
180	BU00024ER	DUP	BU00023ER	DRADS	TRG	URANIUM-238	67	9 5	B	0 076	A	14 4%
180	BU00023ER	REAL		VOACLP	TRG	METHYLENE CHLORIDE	27			5	V	
180	BU00024ER	DUP	BU00023ER	VOACLP	TRG	METHYLENE CHLORIDE	21			5	V	-25 0%
180	BU00023ER	REAL		VOACLP	TRG	TOLUENE	1		J	5	A	
180	BU00024ER	DUP	BU00023ER	VOACLP	TRG	TOLUENE	1		J	5	A	0 0%
180	BU00027ER	REAL		BNACLP	TRG	1,3-ISOBENZOFURANDIONE	23		J		Y	
180	BU00028ER	DUP	BU00027ER	BNACLP	TRG	1,3-ISOBENZOFURANDIONE	25		J		Y	8 3%
180	BU00028ER	DUP	BU00027ER	BNACLP	DIL	2-N-BUTOXYETHANOL	71		J		Y	200 0%
180	BU00028ER	DUP	BU00027ER	BNACLP	TRG	4,4'-ISOPROPYLIDENEDIPHENOL	38		J		Y	200 0%
180	BU00027ER	REAL		BNACLP	TRG	BENZYL ALCOHOL	6		J	10	Y	
180	BU00028ER	DUP	BU00027ER	BNACLP	TRG	BENZYL ALCOHOL	5		J	10	Y	-18 2%
180	BU00027ER	REAL		BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	390		E	10	Y	
180	BU00028ER	DUP	BU00027ER	BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	380		E	10	Y	-2 6%
180	BU00027ER	REAL		BNACLP	DIL	BIS(2-ETHYLHEXYL)PHTHALATE	520		D	10	Y	
180	BU00028ER	DUP	BU00027ER	BNACLP	DIL	BIS(2-ETHYLHEXYL)PHTHALATE	520		D	10	Y	0 0%
180	BU00027ER	REAL		BNACLP	TRG	BUTYL BENZYL PHTHALATE	8		J	10	Y	
180	BU00028ER	DUP	BU00027ER	BNACLP	TRG	BUTYL BENZYL PHTHALATE	10		U	10	Y	22 2%

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
180	BU00027ER	REAL		BNACLP	TRG	DI-n-BUTYL PHTHALATE	44			10	Y	
180	BU00028ER	DUP	BU00027ER	BNACLP	TRG	DI-n-BUTYL PHTHALATE	41			10	Y	-7 1%
180	BU00027ER	REAL		BNACLP	DIL	DI-n-BUTYL PHTHALATE	42		DJ	10	Y	
180	BU00028ER	DUP	BU00027ER	BNACLP	DIL	DI-n-BUTYL PHTHALATE	41		DJ	10	Y	-2 4%
180	BU00027ER	REAL		BNACLP	TRG	DI-n-OCTYL PHTHALATE	23			10	Y	
180	BU00028ER	DUP	BU00027ER	BNACLP	TRG	DI-n-OCTYL PHTHALATE	22			10	Y	-4 4%
180	BU00027ER	REAL		BNACLP	DIL	DI-n-OCTYL PHTHALATE	23		DJ	10	Y	
180	BU00028ER	DUP	BU00027ER	BNACLP	DIL	DI-n-OCTYL PHTHALATE	24		DJ	10	Y	4 3%
180	BU00027ER	REAL		BNACLP	TRG	PHENOL	47			10	Y	
180	BU00028ER	DUP	BU00027ER	BNACLP	TRG	PHENOL	40			10	Y	-16 1%
180	BU00027ER	REAL		BNACLP	DIL	PHENOL	47		DJ	10	Y	
180	BU00028ER	DUP	BU00027ER	BNACLP	DIL	PHENOL	42		DJ	10	Y	-11 2%
180	BU00027ER	REAL		DRADS	TRG	AMERICIUM-241	-0 002	0 008	U	0 015	V	
180	BU00028ER	DUP	BU00027ER	DRADS	TRG	AMERICIUM-241	0 004	0 004	J	0 001	V	600 0%
180	BU00027ER	REAL		DRADS	TRG	GROSS ALPHA	150	3 5		0 41	V	
180	BU00028ER	DUP	BU00027ER	DRADS	TRG	GROSS ALPHA	190	4 0		0 36	V	23 5%
180	BU00027ER	REAL		DRADS	TRG	GROSS BETA	180	6 4		3 0	V	
180	BU00028ER	DUP	BU00027ER	DRADS	TRG	GROSS BETA	180	6 3		2 8	V	0 0%
180	BU00027ER	REAL		DRADS	TRG	PLUTONIUM-239/240	0 006	0 004	J	0 004	V	
180	BU00028ER	DUP	BU00027ER	DRADS	TRG	PLUTONIUM-239/240	0 007	0 004	J	0 001	V	15 4%
180	BU00027ER	REAL		DRADS	TRG	RADIUM-226	46	0 11	BJ	0 15	A	
180	BU00028ER	DUP	BU00027ER	DRADS	TRG	RADIUM-226	51	0 10	B	0 13	A	10 3%
180	BU00027ER	REAL		DRADS	TRG	URANIUM-233,-234	37	5 3	B	0 14	A	
180	BU00028ER	DUP	BU00027ER	DRADS	TRG	URANIUM-233,-234	40	5 9	B	0 075	A	7 8%
180	BU00027ER	REAL		DRADS	TRG	URANIUM-235	4 4	1 1		0 12	A	
180	BU00028ER	DUP	BU00027ER	DRADS	TRG	URANIUM-235	4 5	1 1	B	0 042	A	2 2%
180	BU00027ER	REAL		DRADS	TRG	URANIUM-238	220	28	B	0 15	A	
180	BU00028ER	DUP	BU00027ER	DRADS	TRG	URANIUM-238	250	33	B	0 042	A	12 8%
204	BU00040ER	REAL		BNACLP	DIL	PHENOL	39		J	10	A	
204	BU00041ER	DUP	BU00040ER	BNACLP	DIL	PHENOL	33		J	10	A	-16 7%
204	BU00040ER	REAL		DRADS	TRG	GROSS ALPHA	150	8 0		1	V	
204	BU00041ER	DUP	BU00040ER	DRADS	TRG	GROSS ALPHA	140	7 7		1	V	-6 9%

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
204	BU00040ER	REAL		DRADS	REP	GROSS ALPHA	150	7 8		1		0 0%
204	BU00040ER	REAL		DRADS	TRG	GROSS BETA	72	3 6		2	A	
204	BU00041ER	DUP	BU00040ER	DRADS	TRG	GROSS BETA	78	3 8		2	A	8 0%
204	BU00040ER	REAL		DRADS	REP	GROSS BETA	80	3 8		2		10 5%
204	BU00040ER	REAL		DRADS	TRG	URANIUM-233,-234	24	2 9		0 5	V	
204	BU00041ER	DUP	BU00040ER	DRADS	TRG	URANIUM-233,-234	26	3 1		0 6	V	8 0%
204	BU00040ER	REAL		DRADS	REP	URANIUM-233,-234	21	2 4		0 4		-13 3%
204	BU00040ER	REAL		DRADS	TRG	URANIUM-235	3 5	0 77		0 2	V	
204	BU00041ER	DUP	BU00040ER	DRADS	TRG	URANIUM-235	5 3	0 96		0 2	V	40 9%
204	BU00040ER	REAL		DRADS	REP	URANIUM-235	3 3	0 63		0 2		-5 9%
204	BU00040ER	REAL		DRADS	TRG	URANIUM-238	180	19		0 5	V	
204	BU00041ER	DUP	BU00040ER	DRADS	TRG	URANIUM-238	200	20		0 5	V	10 5%
204	BU00040ER	REAL		DRADS	REP	URANIUM-238	160	16		0 4		-11 8%
204	BU00047ER	REAL		BNACLP	TRG	1,3-Isobenzofurandione	38		J		Z	
204	BU00048ER	DUP	BU00047ER	BNACLP	TRG	1 3-Isobenzofurandione	78		J		Z	69 0%
204	BU00047ER	REAL		BNACLP	DIL	1,3-Isobenzofurandione	34		J		Z	
204	BU00048ER	DUP	BU00047ER	BNACLP	DIL	1,3-Isobenzofurandione	42		J		Z	21 1%
204	BU00047ER	REAL		BNACLP	TRG	1-Hexanol, 2-ethyl-	36		J		Z	
204	BU00048ER	DUP	BU00047ER	BNACLP	TRG	1-Hexanol, 2-ethyl-	78		J		Z	73 7%
204	BU00047ER	REAL		BNACLP	TRG	Benzoic acid, 4-(1,1-dimethyl	130		J		Z	
204	BU00048ER	DUP	BU00047ER	BNACLP	TRG	Benzoic acid, 4-(1,1-dimethyl	180		J		Z	32 3%
204	BU00047ER	REAL		BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	240		E	10	Z	
204	BU00048ER	DUP	BU00047ER	BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	450		E	10	Z	60 9%
204	BU00047ER	REAL		BNACLP	DIL	BIS(2-ETHYLHEXYL)PHTHALATE	780		D	10	V	
204	BU00048ER	DUP	BU00047ER	BNACLP	DIL	BIS(2-ETHYLHEXYL)PHTHALATE	790		D	10	V	1 3%
204	BU00047ER	REAL		BNACLP	TRG	DI-n-OCTYL PHTHALATE	2		J	10	A	
204	BU00048ER	DUP	BU00047ER	BNACLP	TRG	DI-n-OCTYL PHTHALATE	4		J	10	A	66 7%
204	BU00048ER	DUP	BU00047ER	BNACLP	DIL	DI-n-OCTYL PHTHALATE	50		U	10	Z	184 6%
204	BU00048ER	DUP	BU00047ER	BNACLP	TRG	Hexadecanamide	160		J		Z	200 0%
204	BU00047ER	REAL		BNACLP	TRG	Hexadecanoic Acid	18		J		Z	
204	BU00048ER	DUP	BU00047ER	BNACLP	TRG	Hexadecanoic Acid	31		J		Z	53 1%

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
204	BU00047ER	REAL		DRADS	TRG	GROSS ALPHA	160	9 8		2	Y	
204	BU00048ER	DUP	BU00047ER	DRADS	TRG	GROSS ALPHA	180	11		3	Y	11 8%
204	BU00047ER	REAL		DRADS	TRG	GROSS BETA	45	3 1		2	Y	
204	BU00048ER	DUP	BU00047ER	DRADS	TRG	GROSS BETA	63	3 5		2	Y	33 3%
204	BU00047ER	REAL		DRADS	TRG	URANIUM-233,-234	29	3 2		0 5	Y	
204	BU00048ER	DUP	BU00047ER	DRADS	TRG	URANIUM-233,-234	27	3 2		0 5	Y	-7 1%
204	BU00047ER	REAL		DRADS	TRG	URANIUM-235	4 4	0 79		0 2	Y	
204	BU00048ER	DUP	BU00047ER	DRADS	TRG	URANIUM-235	4 3	0 80		0 2	Y	-2 3%
204	BU00047ER	REAL		DRADS	TRG	URANIUM-238	210	20		0 5	Y	
204	BU00048ER	DUP	BU00047ER	DRADS	TRG	URANIUM-238	210	21	B	0 5	Y	0 0%
211	BU00002ER	REAL		BNACLP	TRG	2-METHYLPHENOL	110			10	V	
211	BU00003ER	DUP	BU00002ER	BNACLP	TRG	2-METHYLPHENOL	120			10	V	8 7%
211	BU00002ER	REAL		BNACLP	DL1	2-METHYLPHENOL	110		D	10	Z	
211	BU00003ER	DUP	BU00002ER	BNACLP	DL1	2-METHYLPHENOL	130		D	10	Z	16 7%
211	BU00002ER	REAL		BNACLP	TRG	2-NITROPHENOL	5		J	10	A	
211	BU00003ER	DUP	BU00002ER	BNACLP	TRG	2-NITROPHENOL	10		U	10	V	66 7%
211	BU00002ER	REAL		BNACLP	TRG	BENZOIC ACID	270		E	50	Z	
211	BU00003ER	DUP	BU00002ER	BNACLP	TRG	BENZOIC ACID	230		E	50	Z	-16 0%
211	BU00002ER	REAL		BNACLP	DL1	BENZOIC ACID	250		D	50	V	
211	BU00003ER	DUP	BU00002ER	BNACLP	DL1	BENZOIC ACID	240		D	50	V	-4 1%
211	BU00002ER	REAL		BNACLP	TRG	BENZYL ALCOHOL	10			10	V	
211	BU00003ER	DUP	BU00002ER	BNACLP	TRG	BENZYL ALCOHOL	11			10	V	9 5%
211	BU00002ER	REAL		BNACLP	DL1	BENZYL ALCOHOL	10		DJ	10	Z	
211	BU00003ER	DUP	BU00002ER	BNACLP	DL1	BENZYL ALCOHOL	11		DJ	10	Z	9 5%
211	BU00002ER	REAL		BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	160		B	10	V	
211	BU00003ER	DUP	BU00002ER	BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	160		BE	10	Z	0 0%
211	BU00002ER	REAL		BNACLP	DL1	BIS(2-ETHYLHEXYL)PHTHALATE	140		BD	10	Z	
211	BU00003ER	DUP	BU00002ER	BNACLP	DL1	BIS(2-ETHYLHEXYL)PHTHALATE	210		BD	10	V	40 0%
211	BU00002ER	REAL		BNACLP	TRG	BUTYL BENZYL PHTHALATE	54			10	JA	
211	BU00003ER	DUP	BU00002ER	BNACLP	TRG	BUTYL BENZYL PHTHALATE	75			10	JA	32 6%
211	BU00002ER	REAL		BNACLP	DL1	BUTYL BENZYL PHTHALATE	46		D	10	Z	
211	BU00003ER	DUP	BU00002ER	BNACLP	DL1	BUTYL BENZYL PHTHALATE	78		D	10	Z	51 6%

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
211	BU00002ER	REAL		BNACLP	TRG	DI-n-BUTYL PHTHALATE	10		U	10	R	
211	BU00003ER	DUP	BU00002ER	BNACLP	TRG	DI-n-BUTYL PHTHALATE	5		J	10	A	-66 7%
211	BU00002ER	REAL		BNACLP	TRG	DI-n-OCTYL PHTHALATE	7		J	10	A	
211	BU00003ER	DUP	BU00002ER	BNACLP	TRG	DI-n-OCTYL PHTHALATE	7		J	10	A	0 0%
211	BU00002ER	REAL		BNACLP	DL1	DI-n-OCTYL PHTHALATE	7		DJ	10	Z	
211	BU00003ER	DUP	BU00002ER	BNACLP	DL1	DI-n-OCTYL PHTHALATE	10		DJ	10	Z	35 3%
211	BU00002ER	REAL		BNACLP	TRG	ISOPHORONE	2		J	10	A	
211	BU00003ER	DUP	BU00002ER	BNACLP	TRG	ISOPHORONE	10		U	10	V	133 3%
211	BU00002ER	REAL		BNACLP	TRG	PHENOL	170		E	10	Z	
211	BU00003ER	DUP	BU00002ER	BNACLP	TRG	PHENOL	160		E	10	Z	-6 1%
211	BU00002ER	REAL		BNACLP	DL1	PHENOL	150		D	10	V	
211	BU00003ER	DUP	BU00002ER	BNACLP	DL1	PHENOL	170		D	10	V	12 5%
211	BU00002ER	REAL		METAD	TRG	LITHIUM	11 8		B	100	V	
211	BU00003ER	DUP	BU00002ER	METAD	TRG	LITHIUM	12		B	100	V	1 7%
211	BU00002ER	REAL		METAD	DUP	LITHIUM	10 8		B	100	Z	-8 8%
211	BU00002ER	REAL		METAD	TRG	MOLYBDENUM	39 6		B	200	V	
211	BU00003ER	DUP	BU00002ER	METAD	TRG	MOLYBDENUM	42 3		B	200	JA	6 6%
211	BU00002ER	REAL		METAD	DUP	MOLYBDENUM	37 5		B	200	Z	-5 4%
211	BU00002ER	REAL		METAD	TRG	SILICON	9250			100	JA	
211	BU00003ER	DUP	BU00002ER	METAD	TRG	SILICON	8510			100	JA	-8 3%
211	BU00002ER	REAL		METAD	DUP	SILICON	9080			100	Z	-1 9%
211	BU00002ER	REAL		METAD	TRG	STRONTIUM	177		B	200	V	
211	BU00003ER	DUP	BU00002ER	METAD	TRG	STRONTIUM	186		B	200	V	5 0%
211	BU00002ER	REAL		METAD	DUP	STRONTIUM	170		B	200	Z	-4 0%
211	BU00002ER	REAL		DRADS	TRG	AMERICIUM-241	007	0 006	BJ	0 004	V	
211	BU00002ER	REAL		DRADS	TRG	GROSS ALPHA	7 1	0 93		0 61	V	
211	BU00003ER	DUP	BU00002ER	DRADS	TRG	GROSS ALPHA	7 4	1 0		0 65	V	4 1%
211	BU00002ER	REAL		DRADS	TRG	GROSS BETA	19	2 5		2 6	V	
211	BU00003ER	DUP	BU00002ER	DRADS	TRG	GROSS BETA	16	2 4		2 6	V	-17 1%
211	BU00002ER	REAL		DRADS	TRG	PLUTONIUM-239/240	15	0 024	B	0 003	A	
211	BU00002ER	REAL		DRADS	TRG	RADIUM-226	65	0 19	B	0 24	A	

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
211	BU00003ER	DUP	BU00002ER	DRADS	TRG	RADIUM-226	14	0 070	J	0 10	A	-129 1%
211	BU00003ER	DUP	BU00002ER	DRADS	TRG	URANIUM-233,-234	6 2	1 7	B	0 069	A	200 0%
211	BU00003ER	DUP	BU00002ER	DRADS	TRG	URANIUM-235	25	0 29	J	0 069	A	200 0%
211	BU00003ER	DUP	BU00002ER	DRADS	TRG	URANIUM-238	65	0 48		0 12	A	200 0%
211	BU00002ER	REAL		SMETCL	TRG	ALUMINUM	18 6		U	200	V	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	ALUMINUM	18 6		U	200	V	0 0%
211	BU00002ER	REAL		SMETCL	DUP	ALUMINUM	52 7		B	200	Z	95 7%
211	BU00002ER	REAL		SMETCL	TRG	ARSENIC	2		B	10	JA	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	ARSENIC	2 2		B	10	V	9 5%
211	BU00002ER	REAL		SMETCL	DUP	ARSENIC	1 0		B	10	Z	-66 7%
211	BU00002ER	REAL		SMETCL	TRG	BARIUM	28 8		B	200	V	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	BARIUM	31 5		B	200	V	9 0%
211	BU00002ER	REAL		SMETCL	DUP	BARIUM	27 3		B	200	Z	-5 3%
211	BU00002ER	REAL		SMETCL	TRG	CADMIUM	17			5	JA	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	CADMIUM	3 4		U	5	JA	-133 3%
211	BU00002ER	REAL		SMETCL	DUP	CADMIUM	11 9			5	Z	-35 3%
211	BU00002ER	REAL		SMETCL	TRG	CALCIUM	37400			5000	JA	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	CALCIUM	39400			5000	JA	5 2%
211	BU00002ER	REAL		SMETCL	DUP	CALCIUM	35100			5000	Z	-6 3%
211	BU00002ER	REAL		SMETCL	TRG	COPPER	34 4			25	V	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	COPPER	30 1			25	V	-13 3%
211	BU00002ER	REAL		SMETCL	DUP	COPPER	31 5			25	Z	-8 8%
211	BU00002ER	REAL		SMETCL	TRG	IRON	135			100	JA	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	IRON	68 2		U	100	JA	-65 7%
211	BU00002ER	REAL		SMETCL	DUP	IRON	328			100	Z	83 4%
211	BU00002ER	REAL		SMETCL	TRG	LEAD	9 1			5	V	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	LEAD	4 4			5	V	-69 6%
211	BU00002ER	REAL		SMETCL	DUP	LEAD	8 7			5	Z	-4 5%
211	BU00002ER	REAL		SMETCL	TRG	MAGNESIUM	2690		B	5000	JA	

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	MAGNESIUM	2830		B	5000	JA	5 1%
211	BU00002ER	REAL		SMETCL	DUP	MAGNESIUM	2660		B	5000	Z	-1 1%
211	BU00002ER	REAL		SMETCL	TRG	MANGANESE	3 5		B	15	JA	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	MANGANESE	2 4		B	15	JA	-37 3%
211	BU00002ER	REAL		SMETCL	DUP	MANGANESE	4 5		B	15	Z	25 0%
211	BU00002ER	REAL		SMETCL	TRG	MERCURY	15		B	2	V	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	MERCURY	16		B	2	V	6 5%
211	BU00002ER	REAL		SMETCL	DUP	MERCURY	0 17		B	2	Z	12 5%
211	BU00002ER	REAL		SMETCL	TRG	NICKEL	8 6		U	40	V	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	NICKEL	9		B	40	V	4 5%
211	BU00002ER	REAL		SMETCL	DUP	NICKEL	8 6		U	40	Z	0 0%
211	BU00002ER	REAL		SMETCL	TRG	POTASSIUM	25600			5000	V	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	POTASSIUM	24400			5000	V	-4 8%
211	BU00002ER	REAL		SMETCL	DUP	POTASSIUM	24600			5000	Z	-4 0%
211	BU00002ER	REAL		SMETCL	TRG	SELENIUM	3 8		U	5	JA	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	SELENIUM	3 4		U	5	JA	-11 1%
211	BU00002ER	REAL		SMETCL	DUP	SELENIUM	3 5		B	5	Z	-8 2%
211	BU00002ER	REAL		SMETCL	TRG	SODIUM	53900			5000	JA	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	SODIUM	53700			5000	JA	-0 4%
211	BU00002ER	REAL		SMETCL	DUP	SODIUM	54000			5000	Z	0 2%
211	BU00002ER	REAL		SMETCL	TRG	VANADIUM	18 5		B	50	V	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	VANADIUM	16 3		B	50	V	-12 6%
211	BU00002ER	REAL		SMETCL	DUP	VANADIUM	14 7		B	50	Z	-22 9%
211	BU00002ER	REAL		SMETCL	TRG	ZINC	40 5			20	V	
211	BU00003ER	DUP	BU00002ER	SMETCL	TRG	ZINC	32 3			20	V	-22 5%
211	BU00002ER	REAL		SMETCL	DUP	ZINC	42 7			20	Z	5 3%
211	BU00002ER	REAL		VOACLP	TRG	2-BUTANONE	10		U	10	V	
211	BU00003ER	DUP	BU00002ER	VOACLP	TRG	2-BUTANONE	3		J	10	A	-107 7%
211	BU00002ER	REAL		VOACLP	TRG	METHYLENE CHLORIDE	5		U	5	V	
211	BU00003ER	DUP	BU00002ER	VOACLP	TRG	METHYLENE CHLORIDE	4		J	5	A	-22 2%
211	BU00002ER	REAL		VOACLP	TRG	TOTAL XYLENES	9			5	V	
211	BU00003ER	DUP	BU00002ER	VOACLP	TRG	TOTAL XYLENES	18			5	V	66 7%

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
211	BU00008ER	REAL		BNACLP	DL1	BENZOIC ACID	52		DJ	50	Z	
211	BU00009ER	DUP	BU00008ER	BNACLP	DL1	BENZOIC ACID	43		DJ	50	Z	-18 9%
211	BU00008ER	REAL		BNACLP	TRG	BENZYL ALCOHOL	8		J	10	A	
211	BU00009ER	DUP	BU00008ER	BNACLP	TRG	BENZYL ALCOHOL	6		J	10	A	-28 6%
211	BU00008ER	REAL		BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	300		BE	10	Z	
211	BU00009ER	DUP	BU00008ER	BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	260		BE	10	Z	-14 3%
211	BU00008ER	REAL		BNACLP	DL1	BIS(2-ETHYLHEXYL)PHTHALATE	220		BD	10	V	
211	BU00009ER	DUP	BU00008ER	BNACLP	DL1	BIS(2-ETHYLHEXYL)PHTHALATE	390		BD	10	V	55 7%
211	BU00008ER	REAL		BNACLP	TRG	BUTYL BENZYL PHTHALATE	300		E	10	Z	
211	BU00009ER	DUP	BU00008ER	BNACLP	TRG	BUTYL BENZYL PHTHALATE	250		E	10	Z	-18 2%
211	BU00008ER	REAL		BNACLP	DL1	BUTYL BENZYL PHTHALATE	77		D	10	JA	
211	BU00009ER	DUP	BU00008ER	BNACLP	DL1	BUTYL BENZYL PHTHALATE	130		D	10	JA	51 2%
211	BU00008ER	REAL		BNACLP	TRG	DI-n-BUTYL PHTHALATE	34			10	V	
211	BU00009ER	DUP	BU00008ER	BNACLP	TRG	DI-n-BUTYL PHTHALATE	29			10	V	-15 9%
211	BU00008ER	REAL		BNACLP	DL1	DI-n-BUTYL PHTHALATE	20		DJ	10	Z	
211	BU00009ER	DUP	BU00008ER	BNACLP	DL1	DI-n-BUTYL PHTHALATE	35		DJ	10	Z	54 5%
211	BU00008ER	REAL		BNACLP	TRG	DI-n-OCTYL PHTHALATE	24			10	V	
211	BU00009ER	DUP	BU00008ER	BNACLP	TRG	DI-n-OCTYL PHTHALATE	18			10	V	-28 6%
211	BU00008ER	REAL		BNACLP	DL1	DI-n-OCTYL PHTHALATE	16		DJ	10	Z	
211	BU00009ER	DUP	BU00008ER	BNACLP	DL1	DI-n-OCTYL PHTHALATE	33		DJ	10	Z	69 4%
211	BU00008ER	REAL		BNACLP	TRG	PHENOL	67			10	V	
211	BU00009ER	DUP	BU00008ER	BNACLP	TRG	PHENOL	41			10	V	-48 1%
211	BU00008ER	REAL		BNACLP	DL1	PHENOL	30		DJ	10	Z	
211	BU00009ER	DUP	BU00008ER	BNACLP	DL1	PHENOL	53		D	10	Z	55 4%
211	BU00008ER	REAL		METAD	TRG	LITHIUM	12 1		B	100	V	
211	BU00009ER	DUP	BU00008ER	METAD	TRG	LITHIUM	12 2		B	100	V	0 8%
211	BU00008ER	REAL		METAD	TRG	MOLYBDENUM	10 2		B	200	JA	
211	BU00009ER	DUP	BU00008ER	METAD	TRG	MOLYBDENUM	8 9		B	200	JA	-13 6%
211	BU00008ER	REAL		METAD	TRG	SILICON	5110			100	JA	
211	BU00009ER	DUP	BU00008ER	METAD	TRG	SILICON	4760			100	JA	-7 1%
211	BU00008ER	REAL		METAD	TRG	STRONTIUM	78 8		B	200	V	
211	BU00009ER	DUP	BU00008ER	METAD	TRG	STRONTIUM	78 6		B	200	V	-0 3%

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
211	BU00008ER	REAL		DRADS	TRG	AMERICIUM-241	003	0 004	U	0 006	V	
211	BU00009ER	DUP	BU00008ER	DRADS	TRG	AMERICIUM-241	0	0 002	U	0 004	V	-200 0%
211	BU00008ER	REAL		DRADS	REP	AMERICIUM-241	0 005	0 004	BJ	0 002	V	50 0%
211	BU00008ER	REAL		DRADS	TRG	GROSS ALPHA	4 8	1 4		1 4	V	
211	BU00009ER	DUP	BU00008ER	DRADS	TRG	GROSS ALPHA	2 4	0 54		0 54	V	-66 7%
211	BU00008ER	REAL		DRADS	TRG	GROSS BETA	6 7	2 2		3 0	V	
211	BU00009ER	DUP	BU00008ER	DRADS	TRG	GROSS BETA	8 9	2 1		2 6	V	28 2%
211	BU00008ER	REAL		DRADS	TRG	PLUTONIUM-239/240	02	0 008	B	0 001	A	
211	BU00009ER	DUP	BU00008ER	DRADS	TRG	PLUTONIUM-239/240	013	0 006	B	0 003	A	-42 4%
211	BU00008ER	REAL		DRADS	REP	PLUTONIUM-239/240	0 031	0 022		0 005	A	43 1%
211	BU00008ER	REAL		DRADS	TRG	URANIUM-233,-234	1 5	0 66		0 14	A	
211	BU00009ER	DUP	BU00008ER	DRADS	TRG	URANIUM-233,-234	1 3	0 56		0 14	A	-14 3%
211	BU00008ER	REAL		DRADS	TRG	URANIUM-235	19	0 22	J	0 053	A	
211	BU00009ER	DUP	BU00008ER	DRADS	TRG	URANIUM-235	0	0 222	U	0 044	A	-200 0%
211	BU00008ER	REAL		DRADS	TRG	URANIUM-238	32	0 29	J	0 053	A	
211	BU00009ER	DUP	BU00008ER	DRADS	TRG	URANIUM-238	2	0 21	J	0 074	A	-46 2%
211	BU00008ER	REAL		SMETCL	TRG	ANTIMONY	28 9		B	60	V	
211	BU00009ER	DUP	BU00008ER	SMETCL	TRG	ANTIMONY	25 5		U	60	V	-12 5%
211	BU00008ER	REAL		SMETCL	TRG	ARSENIC	1		B	10	JA	
211	BU00009ER	DUP	BU00008ER	SMETCL	TRG	ARSENIC	1		U	10	JA	0 0%
211	BU00008ER	REAL		SMETCL	TRG	BARIUM	13 7		B	200	V	
211	BU00009ER	DUP	BU00008ER	SMETCL	TRG	BARIUM	16 2		B	200	V	16 7%
211	BU00008ER	REAL		SMETCL	TRG	CADMIUM	3 4		U	5	JA	
211	BU00009ER	DUP	BU00008ER	SMETCL	TRG	CADMIUM	13 5			5	JA	119 5%
211	BU00008ER	REAL		SMETCL	TRG	CALCIUM	13600			5000	JA	
211	BU00009ER	DUP	BU00008ER	SMETCL	TRG	CALCIUM	13400			5000	JA	-1 5%
211	BU00008ER	REAL		SMETCL	TRG	CHROMIUM	8 1		B	10	V	
211	BU00009ER	DUP	BU00008ER	SMETCL	TRG	CHROMIUM	6 7		U	10	V	-18 9%
211	BU00008ER	REAL		SMETCL	TRG	COPPER	43 7			25	V	
211	BU00009ER	DUP	BU00008ER	SMETCL	TRG	COPPER	39 7			25	V	-9 6%
211	BU00008ER	REAL		SMETCL	TRG	IRON	323			100	JA	
211	BU00009ER	DUP	BU00008ER	SMETCL	TRG	IRON	178			100	JA	-57 9%

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
211	BU00008ER	REAL		SMETCL	TRG	LEAD	7 5			5	V	
211	BU00009ER	DUP	BU00008ER	SMETCL	TRG	LEAD	6 8			5	V	-9 8%
211	BU00008ER	REAL		SMETCL	TRG	MAGNESIUM	2000		B	5000	JA	
211	BU00009ER	DUP	BU00008ER	SMETCL	TRG	MAGNESIUM	1980		B	5000	JA	-1 0%
211	BU00008ER	REAL		SMETCL	TRG	MANGANESE	6 3		B	15	JA	
211	BU00009ER	DUP	BU00008ER	SMETCL	TRG	MANGANESE	7 9		B	15	JA	22 5%
211	BU00008ER	REAL		SMETCL	TRG	POTASSIUM	15300			5000	V	
211	BU00009ER	DUP	BU00008ER	SMETCL	TRG	POTASSIUM	16500			5000	V	7 5%
211	BU00008ER	REAL		SMETCL	TRG	SODIUM	28800			5000	JA	
211	BU00009ER	DUP	BU00008ER	SMETCL	TRG	SODIUM	28800			5000	JA	0 0%
211	BU00008ER	REAL		SMETCL	TRG	VANADIUM	11		B	50	V	
211	BU00009ER	DUP	BU00008ER	SMETCL	TRG	VANADIUM	8 3		B	50	V	-28 0%
211	BU00008ER	REAL		SMETCL	TRG	ZINC	91 8			20	V	
211	BU00009ER	DUP	BU00008ER	SMETCL	TRG	ZINC	74 6			20	V	-20 7%
217	BU00017ER	REAL		BNACLP	TRG	BENZOIC ACID	11		J	50	A	
217	BU00018ER	DUP	BU00017ER	BNACLP	TRG	BENZOIC ACID	9		J	50	A	-20 0%
217	BU00017ER	REAL		BNACLP	TRG	BENZYL ALCOHOL	2		J	10	A	
217	BU00018ER	DUP	BU00017ER	BNACLP	TRG	BENZYL ALCOHOL	2		J	10	A	0 0%
217	BU00017ER	REAL		BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	53			10	JA	
217	BU00018ER	DUP	BU00017ER	BNACLP	TRG	BIS(2-ETHYLHEXYL)PHTHALATE	53			10	JA	0 0%
217	BU00017ER	REAL		BNACLP	TRG	BUTYL BENZYL PHTHALATE	21			10	JA	
217	BU00018ER	DUP	BU00017ER	BNACLP	TRG	BUTYL BENZYL PHTHALATE	23			10	JA	9 1%
217	BU00017ER	REAL		BNACLP	TRG	DI-n-BUTYL PHTHALATE	10		U	10	V	
217	BU00018ER	DUP	BU00017ER	BNACLP	TRG	DI-n-BUTYL PHTHALATE	2		J	10	A	-133 3%
217	BU00017ER	REAL		BNACLP	TRG	DI-n-OCTYL PHTHALATE	2		J	10	A	
217	BU00018ER	DUP	BU00017ER	BNACLP	TRG	DI-n-OCTYL PHTHALATE	2		J	10	A	0 0%
217	BU00017ER	REAL		BNACLP	TRG	DIETHYL PHTHALATE	6		J	10	A	
217	BU00018ER	DUP	BU00017ER	BNACLP	TRG	DIETHYL PHTHALATE	6		J	10	A	0 0%
217	BU00017ER	REAL		BNACLP	TRG	PHENOL	18			10	V	
217	BU00018ER	DUP	BU00017ER	BNACLP	TRG	PHENOL	18			10	V	0 0%
217	BU00017ER	REAL		METAD	TRG	LITHIUM	256			100	V	
217	BU00018ER	DUP	BU00017ER	METAD	TRG	LITHIUM	247			100	V	-3 6%

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
217	BU00017ER	REAL		METAD	TRG	MOLYBDENUM	24		B	200	V	
217	BU00018ER	DUP	BU00017ER	METAD	TRG	MOLYBDENUM	23 3		B	200	V	-3 0%
217	BU00017ER	REAL		METAD	TRG	SILICON	3630			100	JA	
217	BU00018ER	DUP	BU00017ER	METAD	TRG	SILICON	3690			100	JA	1 6%
217	BU00017ER	REAL		METAD	TRG	STRONTIUM	108		B	200	V	
217	BU00018ER	DUP	BU00017ER	METAD	TRG	STRONTIUM	109		B	200	V	0 9%
217	BU00017ER	REAL		DRADS	TRG	AMERICIUM-241	0 21	0 032		0 004	V	
217	BU00018ER	DUP	BU00017ER	DRADS	TRG	AMERICIUM-241	0 22	0 038		0 005	V	4 7%
217	BU00017ER	REAL		DRADS	TRG	GROSS ALPHA	30	1 7		0 40	V	
217	BU00018ER	DUP	BU00017ER	DRADS	TRG	GROSS ALPHA	41	2 1		0 61	V	31 0%
217	BU00017ER	REAL		DRADS	TRG	GROSS BETA	20	2 6		2 6	V	
217	BU00018ER	DUP	BU00017ER	DRADS	TRG	GROSS BETA	26	2 8		2 7	V	26 1%
217	BU00017ER	REAL		DRADS	TRG	PLUTONIUM-239/240	0 037	0 014		0 002	V	
217	BU00018ER	DUP	BU00017ER	DRADS	TRG	PLUTONIUM-239/240	0 042	0 012		0 005	V	12 7%
217	BU00017ER	REAL		DRADS	TRG	RADIUM-226	18	0 040	BJ	0 060	A	
217	BU00018ER	DUP	BU00017ER	DRADS	TRG	RADIUM-226	21	0 030	BJ	0 040	A	15 4%
217	BU00017ER	REAL		DRADS	TRG	URANIUM-233,-234	22	3 3		0 13	V	
217	BU00018ER	DUP	BU00017ER	DRADS	TRG	URANIUM-233,-234	27	3 9		0 091	V	20 4%
217	BU00017ER	REAL		DRADS	TRG	URANIUM-235	0 91	0 43		0 064	V	
217	BU00018ER	DUP	BU00017ER	DRADS	TRG	URANIUM-235	0 90	0 40		0 091	V	-1 1%
217	BU00017ER	REAL		DRADS	TRG	URANIUM-238	15	2 5		0 064	V	
217	BU00018ER	DUP	BU00017ER	DRADS	TRG	URANIUM-238	17	2 7		0 091	V	12 5%
217	BU00017ER	REAL		SMETCL	TRG	ANTIMONY	27		B	60	V	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	ANTIMONY	26 4		B	60	V	-2 2%
217	BU00017ER	REAL		SMETCL	TRG	BARIUM	35 3		B	200	V	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	BARIUM	36		B	200	V	2 0%
217	BU00017ER	REAL		SMETCL	TRG	BERYLLIUM	7 2			5	JA	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	BERYLLIUM	7 4			5	JA	2 7%
217	BU00017ER	REAL		SMETCL	TRG	CADMIUM	75 8			5	JA	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	CADMIUM	73 5			5	JA	-3 1%
217	BU00017ER	REAL		SMETCL	TRG	CALCIUM	42300			5000	JA	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	CALCIUM	42700			5000	JA	0 9%

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
217	BU00017ER	REAL		SMETCL	TRG	CHROMIUM	37 5			10	V	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	CHROMIUM	36 9			10	V	-1 6%
217	BU00017ER	REAL		SMETCL	TRG	COBALT	72 2			50	V	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	COBALT	67 9			50	V	-6 1%
217	BU00017ER	REAL		SMETCL	TRG	COPPER	281			25	V	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	COPPER	287			25	V	2 1%
217	BU00017ER	REAL		SMETCL	TRG	IRON	143			100	JA	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	IRON	131			100	JA	-8 8%
217	BU00017ER	REAL		SMETCL	DIL	LEAD	153			5	V	
217	BU00018ER	DUP	BU00017ER	SMETCL	DIL	LEAD	155			5	V	1 3%
217	BU00017ER	REAL		SMETCL	TRG	MAGNESIUM	14000			5000	JA	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	MAGNESIUM	14200			5000	JA	1 4%
217	BU00017ER	REAL		SMETCL	TRG	MANGANESE	1200			15	V	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	MANGANESE	1200			15	V	0 0%
217	BU00017ER	REAL		SMETCL	TRG	MERCURY	1 6			2	V	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	MERCURY	1 7			2	V	6 1%
217	BU00017ER	REAL		SMETCL	TRG	NICKEL	5630			40	V	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	NICKEL	5670			40	V	0 7%
217	BU00017ER	REAL		SMETCL	TRG	POTASSIUM	5270			5000	V	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	POTASSIUM	5140			5000	V	-2 5%
217	BU00017ER	REAL		SMETCL	TRG	SILVER	22 1			10	V	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	SILVER	21 3			10	V	-3 7%
217	BU00017ER	REAL		SMETCL	TRG	SODIUM	17400			5000	JA	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	SODIUM	16600			5000	JA	-4 7%
217	BU00017ER	REAL		SMETCL	TRG	ZINC	986			20	V	
217	BU00018ER	DUP	BU00017ER	SMETCL	TRG	ZINC	1020			20	V	3 4%
217	BU00017ER	REAL		VOACLP	TRG	4-METHYL-2-PENTANONE	26			10	V	
217	BU00018ER	DUP	BU00017ER	VOACLP	TRG	4-METHYL-2-PENTANONE	28			10	V	7 4%
217	BU00017ER	REAL		VOACLP	TRG	CHLOROFORM	5			5	V	
217	BU00018ER	DUP	BU00017ER	VOACLP	TRG	CHLOROFORM	5			5	V	0 0%
217	BU00017ER	REAL		VOACLP	TRG	ETHYLBENZENE	1		J	5	A	
217	BU00018ER	DUP	BU00017ER	VOACLP	TRG	ETHYLBENZENE	1		J	5	A	0 0%

Table 4-3
Duplicate Sample Results and Relative Percent Differences

IHSS	Sample Number	QC Code	QC Partner	Test Group	Result Type	Compound	Result	Error	Qualifier	Detection Limit	Validation Code	RPD
217	BU00017ER	REAL		VOACLP	TRG	TOTAL XYLENES	11			5	V	
217	BU00018ER	DUP	BU00017ER	VOACLP	TRG	TOTAL XYLENES	11			5	V	0 0%
217	BU00017ER	REAL		WQPL	TRG	CYANIDE	142			5	JA	
217	BU00018ER	DUP	BU00017ER	WQPL	TRG	CYANIDE	171			5	JA	18 5%
217	BU00017ER	REAL		WQPL	DUP	CYANIDE	99 8			5	Z	-34 9%

Table 4-4
Equipment Rinsate Blank Sample Results

IHSS	Sample Number	QC Partner	Sample Date	Test Group	Compound	Result	Units	Error	Qualifier	Detection Limit	Validation Code
178	BU00013ER		16-Aug-93	DRADS	PLUTONIUM-239/240	011	PCI/L	0 010	B	0 003	V
178	BU00013ER		16-Aug-93	DRADS	URANIUM-233,-234	65	PCI/L	0 35	B	0 061	A
178	BU00013ER		16-Aug-93	DRADS	URANIUM-238	7	PCI/L	0 36	B	0 036	A
178	BU00013ER		16-Aug-93	VOACLP	TOTAL XYLENES	2	UG/L		J	5	A
179	BU00035ER	BU00033ER	15-Sep-93	BNACLP	BIS(2-ETHYLHEXYL)PHTHALATE	8	UG/L		J	10	Y
179	BU00035ER	BU00033LR	15-Sep-93	BNACLP	UNKNOWN TIC	5	UG/L		J		Y
179	BU00035ER	BU00033LR	15-Sep-93	BNACLP	UNKNOWN TIC	73	UG/L		J		Y
179	BU00035ER	BU00033ER	15-Sep-93	BNACLP	UNKNOWN TIC	6	UG/L		J		Y
179	BU00035ER	BU00033ER	15-Sep-93	BNACLP	UNKNOWN TIC	42	UG/L		J		Y
179	BU00035ER	BU00033ER	15-Sep-93	BNACLP	Unknown-1	5	UG/L		J		Y
179	BU00035ER	BU00033ER	15-Sep-93	BNACLP	Unknown-2	73	UG/L		J		Y
179	BU00035ER	BU00033ER	15-Sep-93	BNACLP	Unknown-3	6	UG/L		J		Y
179	BU00035ER	BU00033ER	15-Sep-93	BNACLP	Unknown-4	42	UG/L		J		Y
179	BU00035ER	BU00033ER	15-Sep-93	DRADS	GROSS ALPHA	0 58	PCI/L	0 26	J	0 28	V
179	BU00035ER	BU00033ER	15-Sep-93	DRADS	PLUTONIUM-239/240	0 002	PCI/L	0 002	J	0 001	V
179	BU00035ER	BU00033ER	15-Sep-93	DRADS	URANIUM-233,-234	0 65	PCI/L	0 42	B	0 054	A
179	BU00035ER	BU00033ER	15-Sep-93	DRADS	URANIUM-235	0 065	PCI/L	0 13	BJ	0 054	A
179	BU00035ER	BU00033ER	15-Sep-93	DRADS	URANIUM-238	0 98	PCI/L	0 53	B	0 054	A
180	BU00025ER	BU00023ER	01-Sep-93	BNACLP	UNKNOWN TIC	9	UG/L		J		Y
180	BU00025ER	BU00023ER	01-Sep-93	BNACLP	UNKNOWN TIC	6	UG/L		J		Y
180	BU00025ER	BU00023ER	01-Sep-93	BNACLP	UNKNOWN TIC	15	UG/L		J		Y
180	BU00025ER	BU00023ER	01-Sep-93	BNACLP	UNKNOWN TIC	180	UG/L		J		Y
180	BU00025ER	BU00023LR	01-Sep-93	BNACLP	UNKNOWN TIC	10	UG/L		J		Y
180	BU00025ER	BU00023ER	01-Sep-93	BNACLP	UNKNOWN TIC	7	UG/L		J		Y
180	BU00025ER	BU00023ER	01-Sep-93	BNACLP	Unknown-1	9	UG/L		J		Y
180	BU00025LR	BU00023ER	01-Sep-93	BNACLP	Unknown-2	6	UG/L		J		Y
180	BU00025ER	BU00023ER	01-Sep-93	BNACLP	Unknown-3	15	UG/L		J		Y
180	BU00025ER	BU00023LR	01-Sep-93	BNACLP	Unknown-4	180	UG/L		J		Y
180	BU00025ER	BU00023ER	01-Sep-93	BNACLP	Unknown-5	10	UG/L		J		Y
180	BU00025ER	BU00023ER	01-Sep-93	BNACLP	Unknown-6	7	UG/L		J		Y

Table 4-4
Equipment Rinsate Blank Sample Results

IHSS	Sample Number	QC Partner	Sample Date	Test Group	Compound	Result	Units	Error	Qualifier	Detection Limit	Validation Code
180	BU00025ER	BU00023ER	01-Sep-93	DRADS	AMERICIUM-241	0 008	PCI/L	0 008	J	0 003	V
180	BU00025ER	BU00023ER	01-Sep-93	DRADS	URANIUM-233,-234	0 67	PCI/L	0 35	B	0 035	A
180	BU00025ER	BU00023ER	01-Sep-93	DRADS	URANIUM-238	1 3	PCI/L	0 50	B	0 035	A
180	BU00025ER	BU00023ER	01-Sep-93	VOACLP	METHYLENE CHLORIDE	5	UG/L			5	V
180	BU00029ER	BU00027ER	02-Sep-93	BNACLP	BIS(2-ETHYLHEXYL)PHTHALATE	17	UG/L			10	Y
180	BU00029ER	BU00027ER	02-Sep-93	BNACLP	UNKNOWN TIC	9	UG/L		J		Y
180	BU00029LR	BU00027LR	02-Sep-93	BNACLP	UNKNOWN TIC	6	UG/L		J		Y
180	BU00029ER	BU00027ER	02-Sep-93	BNACLP	UNKNOWN TIC	21	UG/L		J		Y
180	BU00029ER	BU00027ER	02-Sep-93	BNACLP	UNKNOWN TIC	210	UG/L		J		Y
180	BU00029LR	BU00027LR	02-Sep-93	BNACLP	UNKNOWN TIC	12	UG/L		J		Y
180	BU00029ER	BU00027ER	02-Sep-93	BNACLP	UNKNOWN TIC	12	UG/L		J		Y
180	BU00029ER	BU00027ER	02-Sep-93	BNACLP	Unknown-1	9	UG/L		J		Y
180	BU00029LR	BU00027LR	02-Sep-93	BNACLP	Unknown-2	6	UG/L		J		Y
180	BU00029ER	BU00027ER	02-Sep-93	BNACLP	Unknown-3	21	UG/L		J		Y
180	BU00029ER	BU00027ER	02-Sep-93	BNACLP	Unknown-4	210	UG/L		J		Y
180	BU00029ER	BU00027ER	02-Sep-93	BNACLP	Unknown-5	12	UG/L		J		Y
180	BU00029ER	BU00027ER	02-Sep-93	BNACLP	Unknown-6	12	UG/L		J		Y
180	BU00029ER	BU00027ER	02-Sep-93	DRADS	AMERICIUM-241	0 003	PCI/L	0 004	J	0 001	V
180	BU00029ER	BU00027ER	02-Sep-93	DRADS	GROSS ALPHA	4 4	PCI/L	0 61		0 51	V
180	BU00029ER	BU00027ER	02-Sep-93	DRADS	GROSS BETA	7 5	PCI/L	2 0		2 5	V
180	BU00029ER	BU00027ER	02-Sep-93	DRADS	URANIUM-233,-234	1 6	PCI/L	0 57	B	0 11	A
180	BU00029ER	BU00027ER	02-Sep-93	DRADS	URANIUM-235	0 084	PCI/L	0 13	J	0 067	A
180	BU00029LR	BU00027ER	02-Sep-93	DRADS	URANIUM-238	3 2	PCI/L	0 85	B	0 067	A
204	BU00042ER	BU00040LR	11-Oct-93	BNACLP	BIS(2-ETHYLHEXYL)PHTHALATE	16	UG/L			10	V
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	UNKNOWN TIC	5	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	UNKNOWN TIC	6	UG/L		J		Z
204	BU00042LR	BU00040LR	11-Oct-93	BNACLP	UNKNOWN TIC	8	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	UNKNOWN TIC	7	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	UNKNOWN TIC	8	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	UNKNOWN TIC	4	UG/L		J		Z
204	BU00042LR	BU00040ER	11-Oct-93	BNACLP	UNKNOWN TIC	89	UG/L		J		Z

Table 4-4
Equipment Rinsate Blank Sample Results

IHSS	Sample Number	QC Partner	Sample Date	Test Group	Compound	Result	Units	Error	Qualifier	Detection Limit	Validation Code
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	UNKNOWN TIC	8	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	UNKNOWN TIC	15	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	UNKNOWN TIC	12	UG/L		BJ		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	UNKNOWN TIC	5	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	Unknown-1	8	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	Unknown-10	5	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	Unknown-11	6	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	Unknown-2	7	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	Unknown-3	8	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	Unknown-4	4	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	Unknown-5	89	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	Unknown-6	8	UG/L		J		Z
204	BU00042LR	BU00040LR	11-Oct-93	BNACLP	Unknown-7	15	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	Unknown-8	12	UG/L		BJ		Z
204	BU00042ER	BU00040ER	11-Oct-93	BNACLP	Unknown-9	5	UG/L		J		Z
204	BU00042ER	BU00040ER	11-Oct-93	DRADS	GROSS ALPHA	6 0	PCI/L	1 8		1	V
204	BU00042ER	BU00040ER	11-Oct-93	DRADS	GROSS BETA	2 7	PCI/L	1 3	J	2	V
204	BU00042ER	BU00040ER	11-Oct-93	DRADS	URANIUM-233,-234	0 99	PCI/L	0 35		0 2	V
204	BU00042ER	BU00040ER	11-Oct-93	DRADS	URANIUM-238	6 2	PCI/L	1 1		0 2	V
204	BU00049ER	BU00047ER	09-Nov-93	BNACLP	BIS(2-ETHYLHEXYL)PHTHALATE	5	UG/L		J	10	A
204	BU00049ER	BU00047ER	09-Nov-93	BNACLP	Hexadecanamide	24	UG/L		J		Z
204	BU00049LR	BU00047ER	09-Nov-93	BNACLP	Unknown-1	17	UG/L		J		Z
204	BU00049ER	BU00047ER	09-Nov-93	BNACLP	Unknown-2	13	UG/L		J		Z
204	BU00049ER	BU00047ER	09-Nov-93	BNACLP	Unknown-3	250	UG/L		J		Z
204	BU00049ER	BU00047ER	09-Nov-93	BNACLP	Unknown-4	17	UG/L		J		Z
204	BU00049ER	BU00047ER	09-Nov-93	BNACLP	Unknown-5	16	UG/L		J		Z
204	BU00049LR	BU00047ER	09-Nov-93	BNACLP	Unknown-6	10	UG/L		J		Z
204	BU00049ER	BU00047ER	09-Nov-93	DRADS	URANIUM-238	0 68	PCI/L	0 29		0 2	Y
211	BU00004ER		09-Aug-93	DMETADD	SILICON	223	UG/L			100	JA
211	BU00004ER		09-Aug-93	DMETADD	STRONTIUM	4 5	UG/L		B	200	V
211	BU00004ER		09-Aug-93	DRADS	AMERICIUM-241	009	PCI/L	0 006	BJ	0 002	V

Table 4-4
Equipment Rinsate Blank Sample Results

IHSS	Sample Number	QC Partner	Sample Date	Test Group	Compound	Result	Units	Error	Qualifier	Detection Limit	Validation Code
211	BU00004ER		09-Aug-93	DSMETCLP	CALCIUM	1140	UG/L		B	5000	JA
211	BU00004ER		09-Aug-93	DSMETCLP	SODIUM	272	UG/L		B	5000	JA
211	BU00004ER		09-Aug-93	DSMETCLP	ZINC	2	UG/L		B	20	V
211	BU00004ER		09-Aug-93	VOACLP	METHYLENE CHLORIDE	4	UG/L		J	5	A
211	BU00007ER		11-Aug-93	DMETADD	CESIUM	43	UG/L		B	1000	JA
211	BU00007ER		11-Aug-93	DMETADD	SILICON	70 4	UG/L		B	100	JA
211	BU00007ER		11-Aug-93	DMETADD	STRONTIUM	2 6	UG/L		B	200	V
211	BU00007ER		11-Aug-93	DRADS	AMERICIUM-241	004	PCI/L	0 004	BJ	0 001	V
211	BU00007ER		11-Aug-93	DRADS	URANIUM-233,-234	051	PCI/L	0 10	BJ	0 042	A
211	BU00007ER		11-Aug-93	DSMETCLP	CADMIUM	6 4	UG/L			5	JA
211	BU00007ER		11-Aug-93	DSMETCLP	CALCIUM	652	UG/L		B	5000	JA
211	BU00007ER		11-Aug-93	DSMETCLP	SODIUM	264	UG/L		B	5000	JA
211	BU00007ER		11-Aug-93	DSMETCLP	ZINC	6 4	UG/L		B	20	V
217	BU00019ER		17-Aug-93	DMETADD	STRONTIUM	67	UG/L		B	200	V
217	BU00019ER		17-Aug-93	DRADS	AMERICIUM-241	0 030	PCI/L	0 012		0 006	V
217	BU00019ER		17-Aug-93	DRADS	URANIUM-233,-234	0 13	PCI/L	0 15	J	0 037	V
217	BU00019ER		17-Aug-93	DRADS	URANIUM-238	0 12	PCI/L	0 15	J	0 097	V
217	BU00019ER		17-Aug-93	DSMETCLP	CADMIUM	16 3	UG/L			5	JA
217	BU00019ER		17-Aug-93	DSMETCLP	COPPER	6 4	UG/L		B	25	V
217	BU00019ER		17-Aug-93	DSMETCLP	LEAD	13 6	UG/L			5	V
217	BU00019ER		17-Aug-93	DSMETCLP	SODIUM	310	UG/L		B	5000	JA
217	BU00019ER		17-Aug-93	DSMETCLP	ZINC	8 2	UG/L		B	20	V
217	BU00019ER		17-Aug-93	VOACLP	TOTAL XYLENES	3	UG/L		J	5	A

Table 4-5
Trip Blank Sample Results

IHSS	Sample Number	Sample Date	Test Group	Compound	Result (ug/l)	Error	Qualifier	Detection Limit (ug/l)	Validation Code
180	BU00021ER	01-Sep-93	VOACLP	METHYLENE CHLORIDE	14			5	V
204	BU00046ER	09-Nov-93	VOACLP	METHYLENE CHLORIDE	2		J	5	A
211	BU00005ER	09-Aug-93	VOACLP	METHYLENE CHLORIDE	7			5	V
*	BU00052ER	27 Apr-94	DMETADD	LITHIUM	10 2		B		
	BU00052ER	27 Apr 94	DMETADD	STRONTIUM	0 81		B		
	BU00052ER	27 Apr-94	DSMETCLP	ANTIMONY	30 6		B		
	BU00052ER	27 Apr-94	DSMETCLP	ARSENIC	8 2		B		
	BU00052ER	27 Apr-94	DSMETCLP	BERYLLIUM	0 64		B		
	BU00052ER	27 Apr 94	DSMETCLP	CADMIUM	17 6				
	BU00052ER	27 Apr-94	DSMETCLP	CALCIUM	54 4		B		
	BU00052ER	27 Apr-94	DSMETCLP	COPPER	5		B		
	BU00052ER	27 Apr-94	DSMETCLP	IRON	46 3		B		
	BU00052ER	27 Apr 94	DSMETCLP	LEAD	4 6				
	BU00052ER	27 Apr 94	DSMETCLP	MAGNESIUM	46 5		B		
	BU00052ER	27 Apr-94	DSMETCLP	POTASSIUM	510		B		
	BU00052ER	27 Apr 94	DSMETCLP	SELENIUM	1 9		B		
	BU00052ER	27 Apr 94	DSMETCLP	SILVER	4		B		
	BU00052ER	27 Apr-94	DSMETCLP	SODIUM	332		B		
	BU00052ER	27 Apr-94	DSMETCLP	VANADIUM	12 2		B		
	BU00052ER	27 Apr 94	DSMETCLP	ZINC	3 8		B		

* Trip blank for hot water rinsate blank collection

Table 4-6
Field Blank (Source Water) Sample Results

IHSS	Sample Number	Sample Date	Test Group	Compound	Result (ug/l)	Qualifier	Detection Limit (ug/l)	Validation Code
179	BU00032ER	15-Sep-93	BNACLP	BIS(2 ETHYLHEXYL)PHTHALATE	5	J	10	Y
211	BU00001ER	09-Aug-93	DMETADD	SILICON	3670		100	JA
211	BU00001ER	09-Aug-93	DMETADD	STRONTIUM	43 4	B	200	V
211	BU00001ER	09-Aug-93	DSMETCLP	BARIUM	15 5	B	200	V
211	BU00001ER	09 Aug 93	DSMETCLP	CADMIUM	10 8		5	JA
211	BU00001ER	09-Aug-93	DSMETCLP	CALCIUM	8120		5000	JA
211	BU00001ER	09-Aug 93	DSMETCLP	COPPER	12 9	B	25	V
211	BU00001ER	09-Aug-93	DSMETCLP	IRON	674		100	JA
211	BU00001ER	09 Aug 93	DSMETCLP	LEAD	1 8	B	5	V
211	BU00001ER	09 Aug 93	DSMETCLP	MAGNESIUM	1460	B	5000	JA
211	BU00001ER	09 Aug 93	DSMETCLP	MANGANESE	8 7	B	15	JA
211	BU00001ER	09-Aug 93	DSMETCLP	SODIUM	6250		5000	JA
211	BU00001ER	09-Aug 93	DSMETCLP	ZINC	2 5	B	20	V
180	BU00022ER	01 Sep 93	VOACLP	BROMODICHLOROMETHANE	2	J	5	A
204	BU00039ER	11 Oct 93	VOACLP	BROMODICHLOROMETHANE	3	J	5	A
211	BU00001ER	09-Aug 93	VOACLP	BROMODICHLOROMETHANE	4	J	5	A
		8-Mar 93	VOACLP	BROMODICHLOROMETHANE	6			
		8-Mar 93	VOACLP	BROMODICHLOROMETHANE	5			
		14-Feb 94	VOACLP	BROMODICHLOROMETHANE	4 4			
		14 Feb-94	VOACLP	BROMODICHLOROMETHANE	4 8			
		14 Feb-94	VOACLP	BROMODICHLOROMETHANE	4 4			
179	BU00032ER	15-Sep 93	VOACLP	CHLOROFORM	100		5	V
180	BU00022ER	01-Sep 93	VOACLP	CHLOROFORM	120		5	V
204	BU00039ER	11 Oct 93	VOACLP	CHLOROFORM	95		5	V
211	BU00001ER	09-Aug-93	VOACLP	CHLOROFORM	180		5	V
		16-Aug 93	VOACLP	CHLOROFORM	104			
		16-Aug 93	VOACLP	CHLOROFORM	116			
		16-Aug-93	VOACLP	CHLOROFORM	125			
		10-May 93	VOACLP	CHLOROFORM	36			
		10-May-93	VOACLP	CHLOROFORM	43			
		10-May-93	VOACLP	CHLOROFORM	48			

Table 4-6
Field Blank (Source Water) Sample Results

IHSS	*Sample Number*	*Sample Date*	*Test Group*	*Compound*	*Result (ug/l)*	*Qualifier*	*Detection Limit (ug/l)*	*Validation Code*
		8-Nov-93	VOACLP	CHLOROFORM	44			
		8-Nov 93	VOACLP	CHLOROFORM	56			
		8-Nov-93	VOACLP	CHLOROFORM	43			
		8-Mar 93	VOACLP	CHLOROFORM	62			
		8-Mar-93	VOACLP	CHLOROFORM	43			
		8-Mar 93	VOACLP	CHLOROFORM	48			
		10 Feb-93	VOACLP	CHLOROFORM	30			
		10 Feb-93	VOACLP	CHLOROFORM	38			
		10-Feb-93	VOACLP	CHLOROFORM	30			
		10 Feb 93	VOACLP	CHLOROFORM	39			
		14-Feb 94	VOACLP	CHLOROFORM	47			
		14 Feb-94	VOACLP	CHLOROFORM	40			
		14-Feb 94	VOACLP	CHLOROFORM	42			
		24-Mar 93	VOACLP	DIBROMOCHLOROMETHANE	0 3			
		24 Mar 93	VOACLP	DIBROMOCHLOROMETHANE	0 4			
		24-Mar-93	VOACLP	DIBROMOCHLOROMETHANE	0 2			
180	BU00022ER	01 Sep-93	VOACLP	METHYLENE CHLORIDE	21		5	V
211	BU00001ER	09 Aug 93	VOACLP	METHYLENE CHLORIDE	3	J	5	A
211	BU00001ER	09-Aug-93	VOACLP	TRICHLOROETHENE	1	J	5	A

Table 4-7
Hot Water Rinsate Blank Sample Results

Sample Number	*Sample Date*	*Test Group*	*Compound*	*Result (ug/l)*	*Qualifier*	*Detection Limit (ug/l)*	*Validation Code*
BU00053ER	27-Apr-94	BNACLP	BIS(2-ETHYLHE\YL)PHTHALATE	28			
BU00054ER	27-Apr-94	BNACLP	BIS(2-ETHYLHE\YL)PHTHALATE	19			
BU00055ER	27-Apr-94	BNACLP	BIS(2-ETHYLHEXYL)PHTHALATE	22			
BU00053ER	27-Apr-94	BNACLP	PHENOL	180	E		
BU00054ER	27-Apr-94	BNACLP	PHENOL	220	E		
BU00055ER	27-Apr-94	BNACLP	PHENOL	360	E		
BU00053ER	27-Apr-94	DMETADD	LITHIUM	6 7	B		
BU00053ER	27-Apr-94	DMETADD	SILICON	78 5	B		
BU00054ER	27-Apr-94	DMETADD	SILICON	89 5	B		
BU00055ER	27-Apr-94	DMETADD	SILICON	89 5	B		
BU00053ER	27-Apr-94	DMETADD	STRONTIUM	3 5	B		
BU00054ER	27-Apr-94	DMETADD	STRONTIUM	2 7	B		
BU00055ER	27-Apr-94	DMETADD	STRONTIUM	2 4	B		
BU00053ER	27-Apr-94	DSMETCLP	ARSENIC	1 6	B		
BU00054ER	27-Apr-94	DSMETCLP	ARSENIC	1 5	B		
BU00055ER	27-Apr-94	DSMETCLP	ARSENIC	1 6	B		
BU00053ER	27-Apr-94	DSMETCLP	BARIUM	2 7	B		
BU00055ER	27-Apr-94	DSMETCLP	BARIUM	3 4	B		
BU00053ER	27-Apr-94	DSMETCLP	BERYLLIUM	0 64	B		
BU00053ER	27-Apr-94	DSMETCLP	CADMIUM	2 2	B		
BU00054ER	27-Apr-94	DSMETCLP	CADMIUM	11 7			
BU00055ER	27-Apr-94	DSMETCLP	CADMIUM	5 4			
BU00053ER	27-Apr-94	DSMETCLP	CALCIUM	931	B		
BU00054ER	27-Apr-94	DSMETCLP	CALCIUM	854	B		
BU00055ER	27-Apr-94	DSMETCLP	CALCIUM	753	B		
BU00053ER	27 Apr-94	DSMETCLP	COPPER	24 8	B		
BU00054ER	27-Apr-94	DSMETCLP	COPPER	15 5	B		
BU00055ER	27-Apr-94	DSMETCLP	COPPER	22 7	B		
BU00053ER	27-Apr-94	DSMETCLP	IRON	12 3	B		
BU00054ER	27-Apr-94	DSMETCLP	IRON	9 4	B		
BU00055ER	27-Apr-94	DSMETCLP	IRON	12 1	B		
BU00053ER	27-Apr-94	DSMETCLP	LEAD	4 1			
BU00054ER	27-Apr-94	DSMETCLP	LEAD	5 5			
BU00055ER	27-Apr-94	DSMETCLP	LEAD	2 8	B		
BU00053ER	27-Apr-94	DSMETCLP	MAGNESIUM	79 9	B		
BU00055ER	27-Apr-94	DSMETCLP	MAGNESIUM	58 6	B		
BU00053ER	27-Apr-94	DSMETCLP	MANGANESE	5 2	B		
BU00054ER	27-Apr-94	DSMETCLP	MANGANESE	3 5	B		
BU00055ER	27-Apr-94	DSMETCLP	MANGANESE	2 8	B		
BU00053ER	27 Apr-94	DSMETCLP	POTASSIUM	1020	B		
BU00054ER	27-Apr-94	DSMETCLP	POTASSIUM	475	B		
BU00055ER	27-Apr-94	DSMETCLP	POTASSIUM	501	B		
BU00053ER	27-Apr-94	DSMETCLP	SODIUM	1370	B		
BU00054ER	27-Apr-94	DSMETCLP	SODIUM	965	B		
BU00055ER	27-Apr-94	DSMETCLP	SODIUM	961	B		
BU00053ER	27 Apr-94	DSMETCLP	ZINC	104			
BU00054ER	27 Apr 94	DSMETCLP	ZINC	103			
BU00055ER	27-Apr 94	DSMETCLP	ZINC	133			

Section 5.0

Table requested by DOE is not provided—

5.0 EVALUATION OF RCRA-REGULATED CONSTITUENTS

As described in Section 1 0, the evaluation of the data collected pursuant to the FSP for OU15 involved two distinct steps The first step is an evaluation of the RCRA-regulated constituents as they relate to the closure performance standards within each IHSS, as well as an examination of the potential for releases from each IHSS The potential for releases was addressed in Section 2 0 A comparison of the data collected for each IHSS for RCRA-regulated constituents to the appropriate performance standards is presented in this section

5.1 Approach

This section presents the results of the Stage I and II field investigations for the six IHSSs which compose OU15 Only those individual constituents that were detected by the laboratory analysis of the hot water rinsate samples are reported in the sections below The hot water rinsate sample results presented in this section are a combination of validated and unvalidated data, since the validation process has not yet been completed for all the OU15 samples

The approach taken in this section to evaluate the existing database against the specified RCRA closure performance standards involved comparing the results of chemical analyses of the hot water rinsate samples against the specific closure performance standards The performance standards are described below, followed by a description of the rationale followed in comparing the analytical data to those standards

5.1.1 Data Evaluation

The data evaluated in this section included only those chemical results for RCRA-regulated constituents (i e , constituents listed in 6 CCR 1007-3 Part 261 Appendix VIII) In addition, only positively detected results were included in the analysis Various fields in the RFEDS database were examined to define positively detected results The selection criteria includes

- Only results for RCRA-regulated constituents were evaluated in this section All results for radionuclide analyses were evaluated separately in Section 6 0
- Results qualified with a "U," indicating that the compound was not detected above the instrument detection limit in the sample, were eliminated from further consideration
- Results for organic compounds qualified with a "B," indicating that the compound was detected in a blank sample at a similar concentration, were considered laboratory artifacts and eliminated from further consideration
- Only results with a QC CODE of "REAL" or "DUP" were included Other QC CODE values indicate blank samples or other quality assurance samples
- Only results with a RESULT TYPE of "TRG," "DL1," or "DIL" were evaluated Other RESULT TYPE codes indicate non-target parameters such as tentatively identified compounds and unknowns
- Results reported in units of percent (%) indicate matrix spike compounds added to a sample by the laboratory for quality assurance purposes These records were not considered further
- Results with a qualifier code of "J" for organics or "B" for inorganics were not included since these qualifiers indicate that the reported concentration is an estimate below the CRQL
- All data manually collected (i e , smear sample results and dose-rate survey results) were included for further evaluation These results were evaluated separately in Section 6 0

The remaining results were included in the RCRA evaluation It must be noted that at the time of publication, the validation process had not been completed by RFEDS A fully validated data set will be provided in the Phase I RFI/RI Report

5.1.2 RCRA Closure Performance Standards

This section describes the closure performance standards required by the State RCRA Permit issued October 30, 1991 for RFP The standards require the following

a Close the hazardous and mixed waste units in a manner that minimizes the need for further maintenance and controls, minimizes or eliminates the threat to human health and the environment, and minimizes or eliminates the post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground, surface waters, or the atmosphere

b The closure performance standard for used rinsate from decontamination of concrete secondary containment areas shall be as follow

(1) There must be no detectable levels of hazardous organic constituents,

(2) It must not exhibit any characteristic of a hazardous waste as defined in 6 CCR 1007-3 Part 261, Subpart C, and

(3) The levels of Toxicity Characteristic (TC) metals must be at or below the background level in the unused rinsate solution

c Parameter selection for the used rinsate analysis will be based on the specific wastes stored at the unit These wastes are specified in Part III of the State RCRA permit

At the request of CDH, the OU15 IHSSs will also meet the above closure performance standards The RCRA-regulated constituents of regulatory concern were defined for each

IHSS in the Work Plan, and are as follows

IHSS 178 - radionuclides, Freon TF, and 1,1,1-trichloroethane

IHSS 179 - radionuclides, chlorinated solvents, beryllium, Freon TF, 1,1,1-trichloroethane, and carbon dioxide

IHSS 180 - uranium, radionuclides, beryllium, Freon TF, 1,1,1-trichloroethane, and carbon dioxide

IHSS 204 - uranium, solvents, Freon TF, and 1,1,1-trichloroethane

IHSS 211 - radionuclides, carbon tetrachloride, acetone, methyl alcohol, butyl alcohol, and various TAL metals

IHSS 217 - aqueous cyanide solutions (other contaminants, excluding pesticides and PCBs are possible)

These lists of compounds for each IHSS are used in the evaluations below to support the analysis of RCRA-regulated substances at each IHSS

5.2 IHSS 178

Table 5-1 shows the results of hot water rinsate sampling performed in IHSS 178 The table shows only those compounds positively identified and detected at or above the method detection limit within IHSS 178 Of the five compounds detected, only DEHP, butyl benzyl phthalate, and phenol are RCRA Appendix VIII compounds and are therefore of concern for the RCRA closure of IHSS 178

DEHP was detected in hot water rinsate blank samples at concentrations up to 28 μg/l DEHP was detected at IHSS 178 in sample number BU00011ER, and its duplicate BU00012ER, at 140 μg/l and 160 μg/l, respectively These concentrations are less than one order of magnitude greater than the blank concentration RAGS Part A (EPA, 1989) indicates that, for common cross-contaminants such as DEHP, concentrations within one

order of magnitude of a blank concentration can be attributed to cross-contamination Therefore, the DEHP concentrations have been attributed to leaching from plastic components in the sample collection equipment

Butyl benzyl phthalate is most commonly used in flooring materials and polyvinyl chloride (PVC) Although not specifically detected in the hot water rinsate blank samples, this and other phthalates are commonly leached from paints, plastics, and flooring materials Butyl benzyl phthalate was detected in hot water rinsate samples from IHSSs 178, 211, and 217 These detections are attributed to plastics in the sampling equipment and in flooring materials, and are therefore assumed not to be present as RCRA waste materials at IHSS 178 Furthermore, the list of RCRA-regulated constituents of regulatory concern at IHSS 178, given in Section 5 1 2, does not include phthalates in general, nor butyl benzyl phthalate specifically

Phenol was detected in the hot water rinsate blank samples at concentrations up to 380 μg/l Therefore, the phenol detections of 45 μg/l and 65 μg/l at IHSS 178 are attributed to the hot water rinsate sampling equipment

Since no releases were identified in the historical records or visual inspection reports for IHSS 178, and no RCRA-regulated constituents of regulatory concern were identified in the IHSS sampling, perimeter and pathway sampling results are not presented No verification sampling or Stage III sampling is recommended for IHSS 178

5.3 IHSS 179

Table 5-2 shows the results of hot water rinsate sampling performed in IHSS 179 Two compounds were detected, both RCRA Appendix VIII compounds These were DEHP and phenol

DEHP was detected in hot water rinsate blank samples at concentrations up to 28 μg/l DEHP was detected at IHSS 179 in sample number BU00036ER at 220 μg/l This concentration is less than one order of magnitude greater than the blank concentration and is therefore attributed to leaching from plastic components in the sample collection equipment

Phenol was detected in the hot water rinsate blank samples at concentrations up to 380 μg/l Therefore, the phenol detection of 53 μg/l at IHSS 179 is attributed to the hot water rinsate sampling equipment

Since no releases were identified in the historical records or visual inspection reports for IHSS 179, and no RCRA-regulated constituents of regulatory concern were identified in the IHSS sampling, perimeter and pathway sampling results are not presented No verification sampling or Stage III sampling is recommended for IHSS 179

5.4 IHSS 180

Table 5-3 shows the results of hot water rinsate sampling performed in IHSS 180 Three compounds were detected, all RCRA Appendix VIII compounds These were DEHP, phenol, and methylene chloride

DEHP was detected in hot water rinsate blank samples at concentrations up to 28 μg/l DEHP was detected at IHSS 180 in sample number BU00023ER and its duplicate BU00024ER at 150 μg/l and 190 μg/l, respectively These concentrations are less than one order of magnitude greater than the blank concentration and are therefore attributed to leaching from plastic components in the sample collection equipment

Phenol was detected in the hot water rinsate blank samples at concentrations up to 380 μg/l Therefore, the phenol detections of 47 μg/l (in both the real sample and its duplicate) at IHSS 180 are attributed to the hot water rinsate sampling equipment

Methylene chloride was detected in source water (field blank) samples at concentrations up to 21 μg/l It was also detected in the trip blanks for IHSSs 180, 204, and 211 at concentrations up to 14 μg/l Therefore, the presence of methylene chloride in sample number BU00023ER and its duplicate BU00024ER at 27 μg/l and 21 μg/l, respectively, is attributed to the source water

Since no releases were identified in the historical records or visual inspection reports for IHSS 180, and no RCRA-regulated constituents of regulatory concern were identified in the IHSS sampling, perimeter and pathway sampling results are not presented No verification sampling or Stage III sampling is recommended for IHSS 180

5.5 IHSS 204

Table 5-4 shows the results of hot water rinsate sampling performed in IHSS 204 Five compounds were detected, three of which are RCRA Appendix VIII compounds These were DEHP, di-n-octyl phthalate, and phenol

Based on the listing of RCRA-regulated constituents of regulatory concern at IHSS 204 (a RCRA treatment unit) given in Section 5 1 2, only VOCs, such as solvents and coolants from uranium machining, are of regulatory concern and are therefore subject to evaluation in this section No VOCs or coolants were detected at IHSS 204

Since no releases were identified in the historical records or visual inspection reports for IHSS 204, and no RCRA-regulated constituents of regulatory concern were identified in

the IHSS sampling, perimeter and pathway sampling results are not presented No verification sampling or Stage III sampling is recommended for IHSS 204

5.6 IHSS 211

Table 5-5 shows the results of hot water rinsate sampling performed in IHSS 211 Six organic compounds and nine inorganic compounds were detected Two of the organic compounds (butyl benzyl phthalate and phenol) and two of the inorganic compounds (cadmium and lead) are RCRA Appendix VIII compounds

Butyl benzyl phthalate is most commonly used in flooring materials and PVC Although not specifically detected in the hot water rinsate blank samples, this and other phthalates are commonly leached from paints, plastics, and flooring materials Butyl benzyl phthalate was detected in hot water rinsate samples from IHSSs 178, 211, and 217 These detections are attributed to plastics in the sampling equipment and in flooring materials, and are therefore assumed not to be present as RCRA waste materials at IHSS 211 Furthermore, the list of RCRA-regulated constituents of regulatory concern at IHSS 211, given in Section 5 1 2, does not include phthalates in general, nor butyl benzyl phthalate specifically

Phenol was detected in the hot water rinsate blank samples at concentrations up to 380 μg/l Therefore, the phenol detections of 170 μg/l and 160 μg/l at IHSS 211 are attributed to the hot water rinsate sampling equipment

Cadmium was detected in sample number BU00002ER at 17 μg/l The duplicate of this sample (BU00003ER) reported cadmium as "non-detect" The detection limit in the real and duplicate samples was 5 μg/l Cadmium was detected in one source water sample for IHSS 211 at 10 8 μg/l It was also reported in a trip blank at 17 6 μg/l, in hot water rinsate blanks at concentrations ranging from 2 2 μg/l to 11 7 μg/l, and in equipment

rinse blanks at 6 4 μg/l and 16 3 μg/l Therefore, the presence of cadmium in hot water rinsate samples taken from IHSS 211 is attributed to the source water

Lead was detected in sample number BU00002ER and its duplicate BU00003ER at concentrations of 9 1 and 4 4 μg/l, respectively Lead was detected in the source water sample from IHSS 211 at 1 8 μg/l Lead was also detected in the IHSS 211 trip blank at 4 6 μg/l, in the hot water rinsate blank samples at concentrations ranging from 2 8 μg/l to 5 5 μg/l, and in the equipment rinse blank samples from IHSS 217 at 13 6 μg/l Therefore, the lead concentrations detected in hot water rinsate samples taken at IHSS 211 are attributed to source water

Since no releases were identified in the historical records or visual inspection reports for IHSS 211, and no RCRA-regulated constituents of regulatory concern were identified in the IHSS sampling, perimeter and pathway sampling results are not presented No verification sampling or Stage III sampling is recommended for IHSS 211

5.7 IHSS 217

Table 5-6 shows the results of hot water rinsate sampling performed in IHSS 217 Six organic compounds and eighteen inorganic compounds were detected Four of the organic compounds (DEHP,butyl benzyl phthalate, phenol, and chloroform) and seven of the inorganic compounds (beryllium, cadmium, chromium, mercury, nickel, silver, and cyanide) are RCRA Appendix VIII compounds

Based on the listing of RCRA-regulated constituents of regulatory concern at IHSS 217 (a RCRA treatment unit), only cyanide is of regulatory concern and is therefore subject to evaluation in this section Cyanide was detected in sample number BU00017ER and it's duplicate at 142 μg/l and 171 μg/l Verification sampling will need to be conducted for cyanide at IHSS 217 Cyanide was not detected in the sample from the IHSS 217

perimeter area (the floor adjacent to the laboratory table and hood), therefore, no Stage III sampling is recommended for IHSS 217

5.8 Summary of RCRA Evaluation

The analyses of hot water rinsate samples presented above for each IHSS indicated that only IHSS 217 showed the presence of a RCRA-regulated constituent of regulatory concern attributable to the IHSS The hot water rinsate samples collected at IHSS 217 showed positively identified detectable levels of cyanide The presence of cyanide could not be attributed to any other source

Several of the other IHSSs showed the presence of phthalates DEHP was positively identified in hot water rinsate blank samples All of the phthalates detected are commonly associated with leaching from paints, plastics, and flooring material None of the phthalates was identified as a RCRA-regulated constituent of regulatory concern at any IHSS Therefore, the presence of phthalates was attributed to leaching from the plastic components of the sampling equipment and to leaching from flooring materials and paints

Phenol was detected at several IHSSs, but was also identified in the hot water rinsate blank samples Therefore, the presence of phenol was attributed to the sampling equipment Methylene chloride was detected at one IHSS, but was also detected in trip blanks and source water (field blank) samples, and was therefore attributed to cross-contamination Finally, a few metals were detected in hot water rinsate from IHSS 211 However, these metals were also present at similar concentrations in the source water (field blank samples) Therefore, the presence of these metals was attributed to their presence in the source water used for the hot water rinsate sampling

The visual inspections and review of historical records for all IHSSs did not reveal any evidence of spills or releases from any IHSS which might have caused exterior or outdoor contamination Therefore, no Stage III investigation is recommended

Based on the results of this analysis, verification sampling to confirm or deny the presence of cyanide is recommended for IHSS 217 No other verification sampling or Stage III investigation is recommended at this time

Table 5-1
Organic Compounds Detected in IHSS Hot Water Rinsate Samples
IHSS 178

Building	IHSS	Location	Sample Number	Sample Date	Test Group	Compound	Result (ug/l)	Qualifier	Detection Limit (ug/l)	Validation Code	QC Code	QC Partner	Appendix VIII Compound?
881	178	IHSS	BU00011ER	16-Aug 93	BNACLP	BENZOIC ACID	65		50	JA	REAL		
881	178	IHSS	BU00011ER	16-Aug 93	BNACLP	BIS(2 ETHYLHEXYL)PHTHALATE	140		10	JA	REAL		YES
881	178	IHSS	BU00011ER	16-Aug 93	BNACLP	BUTYL BENZYL PHTHALATE	38		10	JA	REAL		YES
881	178	IHSS	BU00011ER	16-Aug 93	BNACLP	DI-n-BUTYL PHTHALATE	13		10	V	REAL		
881	178	IHSS	BU00011ER	16-Aug 93	BNACLP	PHENOL	45		10	V	REAL		YES
881	178	IHSS	BU00012ER	16-Aug 93	BNACLP	BENZOIC ACID	79		50	JA	DUP	BU00011ER	
881	178	IHSS	BU00012ER	16-Aug 93	BNACLP	BIS(2 ETHYLHEXYL)PHTHALATE	160		10	JA	DUP	BU00011ER	YES
881	178	IHSS	BU00012ER	16-Aug 93	BNACLP	BUTYL BENZYL PHTHALATE	51		10	JA	DUP	BU00011ER	YES
881	178	IHSS	BU00012ER	16-Aug 93	BNACLP	DI n-BUTYL PHTHALATE	17		10	V	DUP	BU00011ER	
881	178	IHSS	BU00012ER	16-Aug 93	BNACLP	PHENOL	65		10	V	DUP	BU00011ER	YES

Table 5-2
Organic Compounds Detected in IHSS Hot Water Rinsate Samples
IHSS 179

Building	*IHSS*	*Location*	*Sample Number*	*Sample Date*	*Test Group*	*Compound*	*Result (ug/l)*	*Qualifier*	*Detection Limit (ug/l)*	*Validation Code*	*QC Code*	*QC Partner*	*Appendix VIII Compound?*
865	179	IHSS	BU00036ER	15 Sep 93	BNACLP	BIS(2 ETHYLHEXYL)PHTHALATE	220		10	Y	REAL		YES
865	179	IHSS	BU00036ER	15 Sep-93	BNACLP	PHENOL	53		10	Y	REAL		YES

Table 5-3
Organic Compounds Detected in IHSS Hot Water Rinsate Samples
IHSS 180

Building	*IHSS*	*Location*	*Sample Number*	*Sample Date*	*Test Group*	*Compound*	*Result (ug/l)*	*Qualifier*	*Detection Limit (ug/l)*	*Validation Code*	*QC Code*	*QC Partner*	*Appendix VIII Compound?*
883	180	IHSS	BU00023ER	01 Sep-93	BNACLP	BIS(2 ETHYLHEXYL)PHTHALATE	150		10	Y	REAL		YES
883	180	IHSS	BU00023ER	01-Sep-93	BNACLP	PHENOL	47		10	Y	REAL		YES
883	180	IHSS	BU00023ER	01 Sep-93	VOACLP	METHYLENE CHLORIDE	27		5	V	REAL		YES
883	180	IHSS	BU00024ER	01 Sep-93	BNACLP	BIS(2 ETHYLHEXYL)PHTHALATE	190	E	10	Y	DUP	BU00023ER	YES
883	180	IHSS	BU00024ER	01 Sep-93	BNACLP	PHENOL	47		10	Y	DUP	BU00023ER	YES
883	180	IHSS	BU00024ER	01 Sep-93	VOACLP	METHYLENE CHLORIDE	21		5	V	DUP	BU00023ER	YES

Table 5-4
Organic Compounds Detected in Hot Water Rinsate Samples
IHSS 204

Building	*IHSS*	*Location*	*Sample Number*	*Sample Date*	*Test Group*	*Compound*	*Result (ug/l)*	*Qualifier*	*Detection Limit (ug/l)*	*Validation Code*	*QC Code*	*QC Partner*	*Appendix VIII Compound?*
447	204	Room 502	BU00044ER	11-Oct 93	BNACLP	BIS(2-ETHYLHEXYL)PHTHALATE	590	E	10	Z	REAL		Yes
447	204	Room 502	BU00044ER	11 Oct 93	BNACLP	DI n-OCTYL PHTHALATE	12		10	V	REAL		Yes
447	204	Room 502	BU00044ER	11 Oct 93	BNACLP	PHENOL	23		10	V	REAL		Yes
447	204	Inlet	BU00045ER	11 Oct 93	BNACLP	BIS(2 ETHYLHEXYL)PHTHALATE	230	E	10	Z	REAL		Yes
447	204	Inlet	BU00045ER	11 Oct 93	BNACLP	DI n-OCTYL PHTHALATE	28		10	V	REAL		Yes
447	204	Inlet	BU00045ER	11 Oct 93	BNACLP	PHENOL	98		10	V	REAL		Yes
447	204	Room 32	BU00050ER	09 Nov-93	BNACLP	BENZOIC ACID	160	E	50	A	REAL		
447	204	Room 32	BU00050ER	09 Nov-93	BNACLP	BIS(2 ETHYLHEXYL)PHTHALATE	160		10	V	REAL		Yes
447	204	Room 32	BU00050ER	09 Nov 93	BNACLP	DI n-OCTYL PHTHALATE	16		10	V	REAL		Yes
447	204	Room 32	BU00050ER	09 Nov 93	BNACLP	PHENOL	58		10	V	REAL		Yes
447	204	Outlet	BU00051ER	09 Nov 93	BNACLP	2 NITROPHENOL	13		10	V	REAL		
447	204	Outlet	BU00051ER	09 Nov 93	BNACLP	BIS(2 ETHYLHEXYL)PHTHALATE	57		10	V	REAL		Yes
447	204	Outlet	BU00051ER	09 Nov 93	BNACLP	DI n-OCTYL PHTHALATE	43		10	V	REAL		Yes
447	204	Outlet	BU00051ER	09 Nov 93	BNACLP	PHENOL	440	E	10	Z	REAL		Yes

Table 5-5
Organic and Inorganic Compounds Detected in IHSS Hot Water Rinsate Samples
IHSS 211

Building	IHSS	Location	Sample Number	Sample Date	Test Group	Compound	Result (ug/l)	Qualifier	Detection Limit (ug/l)	Validation Code	QC Code	QC Partner*	Appendix VIII Compound?
881	211	IHSS	BU00002ER	09 Aug 93	BNACLP	2 METHYLPHENOL	110		10	V	REAL		
881	211	IHSS	BU00002ER	09 Aug 93	BNACLP	BENZOIC ACID	270	E	50	Z	REAL		
881	211	IHSS	BU00002ER	09 Aug 93	BNACLP	BENZYL ALCOHOL	10		10	V	REAL		
881	211	IHSS	BU00002ER	09 Aug 93	BNACLP	BUTYL BENZYL PHTHALATE	54		10	JA	REAL		YES
881	211	IHSS	BU00002ER	09 Aug 93	BNACLP	PHENOL	170	E	10	Z	REAL		YES
881	211	IHSS	BU00002ER	09 Aug 93	DMETADD	SILICON	9250		100	JA	REAL		
881	211	IHSS	BU00002ER	09 Aug 93	DSMETCLP	CADMIUM	17		5	JA	REAL		YES
881	211	IHSS	BU00002ER	09 Aug 93	DSMETCLP	CALCIUM	37400		5000	JA	REAL		
881	211	IHSS	BU00002ER	09 Aug 93	DSMETCLP	COPPER	34 4		25	V	REAL		
881	211	IHSS	BU00002ER	09 Aug 93	DSMETCLP	IRON	135		100	JA	REAL		
881	211	IHSS	BU00002ER	09 Aug 93	DSMETCLP	LEAD	9 1		5	V	REAL		YES
881	211	IHSS	BU00002ER	09 Aug 93	DSMETCLP	POTASSIUM	25600		5000	V	REAL		
881	211	IHSS	BU00002ER	09 Aug 93	DSMETCLP	SODIUM	53900		5000	JA	REAL		
881	211	IHSS	BU00002ER	09 Aug 93	DSMETCLP	ZINC	40 5		20	V	REAL		
881	211	IHSS	BU00002ER	09 Aug 93	VOACLP	TOTAL XYLENES	9		5	V	REAL		
881	211	IHSS	BU00003ER	09 Aug 93	BNACLP	2 METHYLPHENOL	120		10	V	DUP	BU00002ER	
881	211	IHSS	BU00003ER	09 Aug 93	BNACLP	BENZOIC ACID	230	E	50	Z	DUP	BU00002ER	
881	211	IHSS	BU00003ER	09 Aug 93	BNACLP	BENZYL ALCOHOL	11		10	V	DUP	BU00002ER	
881	211	IHSS	BU00003ER	09 Aug 93	BNACLP	BUTYL BENZYL PHTHALATE	75		10	JA	DUP	BU00002ER	YES
881	211	IHSS	BU00003ER	09 Aug 93	BNACLP	PHENOL	160	E	10	Z	DUP	BU00002ER	YES
881	211	IHSS	BU00003ER	09 Aug 93	DMETADD	SILICON	8510		100	JA	DUP	BU00002ER	
881	211	IHSS	BU00003ER	09 Aug 93	DSMETCLP	CALCIUM	39400		5000	JA	DUP	BU00002ER	
881	211	IHSS	BU00003ER	09 Aug 93	DSMETCLP	COPPER	30 1		25	V	DUP	BU00002ER	
881	211	IHSS	BU00003ER	09 Aug 93	DSMETCLP	LEAD	4 4		5	V	DUP	BU00002ER	YES
881	211	IHSS	BU00003ER	09 Aug 93	DSMETCLP	POTASSIUM	24400		5000	V	DUP	BU00002ER	
881	211	IHSS	BU00003ER	09 Aug 93	DSMETCLP	SODIUM	53700		5000	JA	DUP	BU00002ER	
881	211	IHSS	BU00003ER	09 Aug 93	DSMETCLP	ZINC	32 3		20	V	DUP	BU00002ER	
881	211	IHSS	BU00003ER	09 Aug 93	VOACLP	TOTAL XYLENES	18		5	V	DUP	BU00002ER	

* The data for IHSS 211 QC Partner samples was not input into RFEDS but has been manually entered here

Table 5-6
Organic and Inorganic Compounds Detected in IHSS Hot Water Rinsate Samples
IHSS 217

Building	*IHSS*	*Location*	*Sample Number*	*Sample Date*	*Test Group*	*Compound*	*Result (ug/l)*	*Qualifier*	*Detection Limit (ug/l)*	*Validation Code*	*QC Code*	*QC Partner*	*Appendix VIII Compound?*
881	217	IHSS	BU00017ER	17 Aug 93	BNACLP	BIS(2 ETHYLHEXYL)PHTHALATE	53		10	JA	REAL		YES
881	217	IHSS	BU00017ER	17 Aug 93	BNACLP	BUTYL BENZYL PHTHALATE	21		10	JA	REAL		YES
881	217	IHSS	BU00017ER	17 Aug 93	BNACLP	PHENOL	18		10	V	REAL		YES
881	217	IHSS	BU00017ER	17 Aug 93	DMETADD	LITHIUM	256		100	V	REAL		
881	217	IHSS	BU00017ER	17 Aug 93	DMETADD	SILICON	3630		100	JA	REAL		
881	217	IHSS	BU00017ER	17 Aug 93	DSMETCLP	BERYLLIUM	7 2		5	JA	REAL		YES
881	217	IHSS	BU00017ER	17 Aug 93	DSMETCI P	CADMIUM	75 8		5	JA	REAL		YES
881	217	IHSS	BU00017ER	17 Aug 93	DSMETCLP	CALCIUM	42300		5000	JA	REAL		
881	217	IHSS	BU00017ER	17 Aug 93	DSMETCLP	CHROMIUM	37 5		10	V	REAL		YES
881	217	IHSS	BU00017ER	17 Aug 93	DSMETCLP	COBALT	72 2		50	V	REAL		
881	217	IHSS	BU00017ER	17 Aug 93	DSMETCLP	COPPER	281		25	V	REAL		
881	217	IHSS	BU00017ER	17 Aug 93	DSMETCLP	IRON	143		100	JA	REAL		
881	217	IHSS	BU00017ER	17 Aug 93	DSMETCLP	MAGNESIUM	14000		5000	JA	REAL		
881	217	IHSS	BU00017ER	17 Aug 93	DSMETCLP	MANGANESE	1200		15	V	REAL		
881	217	IHSS	BU00017ER	17 Aug 93	DSMETCLP	MERCURY	1 6		2	V	REAL		YES
881	217	IHSS	BU00017ER	17 Aug 93	DSMETCLP	NICKEL	5630		40	V	REAL		YES
881	217	IHSS	BU00017ER	17 Aug 93	DSMETCLP	POTASSIUM	5270		5000	V	REAI		
881	217	IHSS	BU00017ER	17 Aug 93	DSMETCLP	SILVER	22 1		10	V	REAL		YES
881	217	IHSS	BU00017ER	17 Aug 93	DSMETCLP	SODIUM	17400		5000	JA	REAL		
881	217	IHSS	BU00017ER	17 Aug 93	DSMETCLP	ZINC	986		20	V	REAL		
881	217	IHSS	BU00017ER	17 Aug 93	VOACLP	4 METHYL 2 PENTANONE	26		10	V	REAI		
881	217	IHSS	BU00017ER	17 Aug 93	VOACLP	CHLOROFORM	5		5	V	REAL		YES
881	217	IHSS	BU00017ER	17 Aug 93	VOACLP	TOTAL XYLENES	11		5	V	REAL		
881	217	IHSS	BU00017ER	17 Aug 93	WQPL	CYANIDE	142		5	JA	REAL		YES
881	217	IHSS	BU00018ER	17 Aug 93	BNACLP	BIS(2 ETHYLHEXYL)PHTHALATE	53		10	JA	DUP	BU00017ER	YES
881	217	IHSS	BU00018ER	17 Aug 93	BNACLP	BUTYL BENZYL PHTHALATE	23		10	JA	DUP	BU00017ER	YES
881	217	IHSS	BU00018FR	17 Aug 93	BNACLP	PHENOL	18		10	V	DUP	BU00017ER	YES
881	217	IHSS	BU00018ER	17 Aug 93	DMETADD	LITHIUM	247		100	V	DUP	BU00017ER	
881	217	IHSS	BU00018ER	17 Aug 93	DMETADD	SILICON	3690		100	JA	DUP	BU00017ER	
881	217	IHSS	BU00018ER	17 Aug 93	DSMETCLP	BERYLLIUM	7 4		5	JA	DUP	BU00017ER	YES
881	217	IHSS	BU00018ER	17 Aug 93	DSMETCLP	CADMIUM	73 5		5	JA	DUP	BU00017ER	YES
881	217	IHSS	BU00018ER	17 Aug 93	DSMETCLP	CALCIUM	42700		5000	JA	DUP	BU00017ER	
881	217	IHSS	BU00018ER	17 Aug 93	DSMETCLP	CHROMIUM	36 9		10	V	DUP	BU00017ER	YES
881	217	IHSS	BU00018ER	17 Aug 93	DSMETCLP	COBALT	67 9		50	V	DUP	BU00017ER	
881	217	IHSS	BU00018ER	17 Aug 93	DSMETCLP	COPPER	287		25	V	DUP	BU00017FR	
881	217	IHSS	BU00018ER	17 Aug 93	DSMETCLP	IRON	131		100	JA	DUP	BU00017ER	
881	217	IHSS	BU00018ER	17 Aug 93	DSMETCLP	MAGNESIUM	14200		5000	JA	DUP	BU00017ER	
881	217	IHSS	BU00018ER	17 Aug 93	DSMETCLP	MANGANESE	1200		15	V	DUP	BU00017ER	
881	217	IHSS	BU00018ER	17 Aug 93	DSMETCLP	MERCURY	1 7		2	V	DUP	BU00017ER	YES

Table 5-6
Organic and Inorganic Compounds Detected in IHSS Hot Water Rinsate Samples
IHSS 217

Building	*IHSS*	*Location*	*Sample Number*	*Sample Date*	*Test Group*	*Compound*	*Result (ug/l)*	*Qualifier*	*Detection Limit (ug/l)*	*Validation Code*	*QC Code*	*QC Partner*	*Appendix VIII Compound?*
881	217	IHSS	BU00018ER	17 Aug 93	DSMETCLP	NICKEL	5670		40	V	DUP	BU00017ER	YES
881	217	IHSS	BU00018ER	17 Aug 93	DSMETCLP	POTASSIUM	5140		5000	V	DUP	BU00017ER	
881	217	IHSS	BU00018ER	17 Aug 93	DSMETCLP	SILVER	21 3		10	V	DUP	BU00017ER	YES
881	217	IHSS	BU00018ER	17 Aug 93	DSMETCLP	SODIUM	16600		5000	JA	DUP	BU00017ER	
881	217	IHSS	BU00018ER	17 Aug 93	DSMETCLP	ZINC	1020		20	V	DUP	BU00017ER	
881	217	IHSS	BU00018ER	17 Aug 93	VOACLP	4 METHYL 2 PENTANONE	28		10	V	DUP	BU00017ER	
881	217	IHSS	BU00018ER	17 Aug 93	VOACLP	CHLOROFORM	5		5	V	DUP	BU00017ER	YES
881	217	IHSS	BU00018ER	17 Aug 93	VOACLP	TOTAL XYLENES	11		5	V	DUP	BU00017ER	
881	217	IHSS	BU00018ER	17 Aug 93	WQPL	CYANIDE	171		5	JA	DUP	BU00017ER	YES

Section 6 0

6.0 CERCLA EVALUATION

This section presents the decision process used for each IHSS to determine the need for further action with respect to radionuclides and beryllium Section 6 1 describes the approach taken to evaluating radionuclide and beryllium data Sections 6 2 through 6 7 present the decision process applied to each IHSS Section 6 8 provides a summary of the decision process for all IHSSs

6.1 Approach

To determine whether any of the IHSSs require additional CERCLA evaluation prior to closure, the radionuclide data collected during the Stage I and II field investigations were evaluated using dose-estimation methods If the estimated doses from radionuclides present within an IHSS fell below the appropriate regulatory criteria, then no further action was recommended, and the IHSS was considered suitable for closure

Beryllium data were addressed in a different manner to allow for consistency with RFP beryllium control procedures and ongoing building reuse and Decontamination and Decommissioning (D&D) efforts The results of the beryllium smear samples are presented for IHSSs 179 and 180 in Sections 6 3 and 6 4, respectively Conclusions as to the need for further action with regard to beryllium contamination are presented in Section 6 8

6.1.1 Radionuclide Data Evaluation

This section discusses the data which will be used to evaluate radionuclides at each of the six IHSSs The specific data are presented in data tables for each IHSS in Sections 6 2 through 6 7 The radiological data collected during the Stage I and II field work included the following

- fixed alpha and beta radiation surveys,
- beta and gamma dose-rate data, expressed as millirems of radiation exposure per unit of time,
- gross alpha and beta counts for smear samples, expressed as radiological activity per unit area, and
- radionuclide-specific data for hot water rinsate samples, expressed as radiological activity per unit volume (these were converted to a unit area basis consistent with the smear sampling data as described below)

The fixed alpha and beta radiation surveys will not be evaluated further Due to the high detection limits of the instruments used, and the variability of the results, these data are not of the appropriate quality for a dose analysis For alpha radiation, only the removable portion of the total radiation is important, because alpha radiation is only a health concern via ingestion or inhalation External alpha radiation will not generally penetrate even the outer layers of skin For beta radiation, the removable portion is characterized by the beta smear samples, while the external irradiation component from fixed beta radiation is characterized by the beta dose-rate surveys The data provided by the removable alpha and beta smear samples, and the beta and gamma dose-rate surveys are of higher quality, and are sufficient to complete the radiological analysis of each IHSS Therefore, the fixed radiation surveys are not required to complete the objectives of the analysis

The radionuclides which were evaluated for OU15 included all those positively identified at OU15 The radionuclides detected were Americium-241 (Am-241), Radium-226 (Ra-226), Plutonium-239 (Pu-239), Plutonium-240 (Pu-240), Uranium-233 (U-233), Uranium-234 (U-234), Uranium-235 (U-235), and Uranium-238 (U-238)

The current project database has not yet been fully validated in RFEDS A full set of validated hot water rinsate analytical data will be provided in the Phase I RFI/RI Report

Further validation of the data set may result in small changes to the reported activities, however, it is not expected that the changes will be of a magnitude which would alter the conclusions of this analysis

The radionuclide activity levels presented in data tables in Sections 6 2 through 6 7 are converted from the reported result in pCi/l to a dust equivalent activity in pCi/g, as follows

$$C_{dust} = C_{rinsate} * \frac{RV}{A * SD}$$

where

C_{dust} = dust equivalent activity (pCi/g)

$C_{rinsate}$ = hot water rinsate activity (pCi/l)

RV = rinsate volume (l)

A = rinsate sample area (m^2)

SD = surface dust amount (g/m^2)

The surface dust amount was assumed to be 560 mg/m^2, or 0 56 g/m^2 (Hawley, 1985) An example calculation is provided below for a Pu-239/240 activity of 7 9 pCi/l, a rinsate volume of 15 09 l, and a rinsate area of 10 m^2

$$C_{dust} = 7\ 9 * \frac{15\ 09}{10 * 0\ 56} = 21\ 3 pCi/g$$

6.1.2 Radionuclide Standards

The results of the field radiation surveys and the smear and hot water rinsate sampling undertaken at OU15 were compared to the Code of Federal Regulations (CFR) and DOE standards outlined in Section 3 0 of the Work Plan and listed below

10 CFR 20, App B	Protection against radiation,
29 CFR 1910 96 (b)	Exposure of individuals to radiation in restricted areas,
29 CFR 1910 96 (c)	Exposure of airborne radioactive materials,
29 CFR 1910 96 (l)	Notification of incidents,
DOE Order 5400 5	Radiation protection of the public and the environment, and
DOE Order 5480 11	Radiation protection for occupational workers

Dose-based screening levels express the maximum rate (e g , hourly or daily) at which individuals may be exposed to radiation Dose-rates are typically expressed as millirems per year or rems per year, and indicate the maximum acceptable whole-body dose an individual may receive over the indicated time period Dose-based screening levels do not relate directly to excess cancer risk, and are commonly used by health-physicists or promulgated as guidance by DOE, the Atomic Energy Commission, and the Nuclear Regulatory Commission (NRC)

The specific dose-rate standards that are used to establish the screening levels for all radionuclides for the OU15 Stage I and II data are listed below

Whole body, head and trunk, active blood-forming organs, lens of eyes, or gonads	1-¼ rem per calendar quarter
hands and forearms, feet and ankles	18-¾ rem per calendar quarter
skin of whole body	7-½ rem per calendar quarter

In addition to dose-rate limitations, concentrations of specific airborne radionuclides are presented in the regulations which correspond to the specified dose-rate limitations These airborne concentration limitations were used to establish the screening levels for the OU15 Stage I and II data Acceptable air concentrations of radionuclides were converted to acceptable dust concentrations using the following equation, which is presented in "Residual Radioactive Contamination from Decommissioning" (NRC, 1990)

$$C_{dust}\left(\frac{pCi}{g}\right)=\frac{C_{air}\left(\frac{pCi}{m^3}\right)}{DL\left(\frac{g}{m^3}\right)}$$

where DL is the dust loading in air The dust loading value used was 100 $\mu g/m^3$ (NRC, 1993) An example calculation is provided below for Am-241, for which the given airborne standard is 6 00 x 10-12 $\mu Ci/ml$

$$DustEquivalent=\frac{6\,00*10^{-12}\ \mu Ci/ml}{100\mu g/m^3}*\frac{10^6 ml}{m^3}*\frac{10^6\mu g}{g}*\frac{10^6 pCi}{\mu Ci}=6\,00*10^4 pCi/g$$

The standards given for the radionuclides and their equivalent dust concentrations are provided below

Radionuclide	Occupational Airborne Concentration Limit (μCi/ml)	Dust Equivalent (pCi/g)
Am-241 (soluble)	6 00e-12	6 00e+4
Ra-226 (soluble)	3 00e-11	3 00e+5
Pu-239 (soluble)	2 00e-12	2 00e+4
Pu-240 (soluble)	2 00e-12	2 00e+4
U-233 (soluble)	5 00e-10	5 00e+6
U-234 (soluble)*	6 00e-10	6 00e+6
U-235 (soluble)*	5 00e-10	5 00e+6
U-238 (soluble)*	7 00e-11	7 00e+5

* For soluble mixtures of U-234, U-235, and U-238 in air, chemical toxicity may be the limiting factor The CFR and DOE standards listed in this section provide details on calculating the concentration values

The radionuclide analytical results were compared to the dose-rate and airborne concentration screening levels criteria identified above Where the data showed an exceedence of any of the above screening criteria, a whole-body dose estimate was made using International Commission on Radiological Protection (ICRP) dose conversion factors provided in Federal Guidance Reports 11 and 12 (EPA, 1988, EPA, 1993) A computer code was used to perform the dose conversion calculations, although no fate and transport calculations were made

Dose conversions were calculated using the Hanford Environmental Dosimetry System (Generation II, or GENII) The GENII computer code was developed through the Hanford Environmental Dosimetry Upgrade Project in November 1988, and is designed to implement the internal dosimetry models recommended by the ICRP Additional

details on the operation of the GENII code can be found in "GENII - The Hanford Environmental Dosimetry Software System, Volumes 1 through 3" (Napier, et al , 1988) The GENII code was recommended for use in evaluating exposures to residual radionuclides within buildings by the NRC (NRC, 1990)

The radiological screening was performed in four steps, as follows

1 The hot water rinsate radionuclide results shown in Tables 6-1, 6-4, 6-8, 6-12, 6-14, and 6-17 were screened against the dust equivalent screening levels provided above

2 The post-rinsate alpha and beta smear sample results presented in Tables 6-2, 6-5, 6-9, 6-15, and 6-18 were also screened against the levels shown above Since the specific radionuclide inventory making up the total alpha and beta counts is unknown, the conservative assumption was made to screen against the radionuclide with the lowest acceptable level in dust All of the radionuclides detected at OU15 are alpha particle emitters Therefore, the lowest level shown above (2 00 x 10^4 pCi/g in dust for Pu-239/240) was used to screen all alpha smear data Of the radionuclides detected at OU15, none are direct beta-emitters However, U-235 and U-238 decay to produce Thorium-231 and Thorium-234 (Th-231 and Th-234) The standards for these isotopes are higher (1 x 10^6 μCi/ml and 6 x 10^{-8} μCi/ml in air, respectively) than any of the isotopes analyzed as part of the OU15 Phase I RFI/RI Therefore, to be conservative, all beta smear samples were screened against the acceptable dust level for U-238

3 The beta and gamma dose-rate survey results presented in Tables 6-3, 6-6, 6-10, 6-16, and 6-19 were screened against the whole body dose limit of 1-¼ rem per calendar quarter, listed above This dose limit was converted assuming a standard worker exposure of 500 hours per quarter, resulting in a screening level of 2 5 mrem/hr

4 In IHSSs where any of the hot water rinsate radionuclide results, the alpha and beta smear sample results, or the beta and gamma dose-rate surveys failed the initial screening, the post-rinsate smear data were used with the GENII computer code to determine the pathway-specific and organ-specific doses resulting from the maximum total alpha or beta activity detected anywhere in the IHSS The approach used to determine doses was based on the NRC indoor dust exposure scenario (NRC, 1990) In addition, the use of the highest activity detected in the IHSS instead of an average activity yielded a conservative estimate of the total

dose Finally, since the radionuclide inventory in the total alpha and beta smear results was unknown, a GENII run was made using the total activity for each of the radionuclides detected at OU15 The highest predicted dose-rate was then compared to the quarterly dose-rate limit to complete the screening analysis

The results of the four-step radiological screening for each IHSS are presented in Sections 6 2 through 6 7

6.2 IHSS 178

The analytical data for radionuclides detected in the hot water rinsate samples from IHSS 178 are included in Table 6-1 The analytical results of the radiological smear samples collected initially and during the final radiological surveys (pre- and post-rinsate samples) are presented in Table 6-2 The results of the beta and gamma dose-rate surveys are summarized in Table 6-3

The results of the four-step radionuclide screening process are presented below

Step 1

No radionuclides detected in the hot water rinsate samples exceeded the permissible radionuclide levels presented in Section 6 1 2

Step 2

None of the post-rinsate smear samples exhibited total alpha activity exceeding the permissible radionuclide levels presented in Section 6 1 2 In addition, none of the post-rinsate smear samples exhibited total beta activity exceeding permissible U-238 levels presented in Section 6 1 2

Step 3

None of the areas surveyed for beta and gamma dose-rate exceeded the established screening limit of 2 5 mrem/hr

Step 4

Since none of the data collected in steps 1 through 3 at IHSS 178 exceeded the screening criteria, no GENII analysis was performed for this IHSS

6.3 IHSS 179

The analytical results for the hot water rinsate samples, alpha and beta smear samples, and beta and gamma dose-rate surveys for IHSS 179 are provided in Tables 6-4 through 6-6 The results of the beryllium smear samples collected initially and during the final radiological surveys (pre- and post-rinsate samples) are provided in Table 6-7

The results of the four-step radionuclide screening process are presented below

Step 1

No radionuclides detected in the hot water rinsate samples exceeded the permissible radionuclide levels presented in Section 6 1 2

Step 2

None of the post-rinsate smear samples exhibited total alpha or beta activity exceeding the permissible levels presented in Section 6 1 2

Step 3

None of the areas surveyed for beta and gamma dose-rate in IHSS 179 exceeded the established screening limit of 2 5 mrem/hr

Step 4

Since none of the data collected in steps 1 through 3 at IHSS 179 exceeded the screening criteria, no GENII analysis was performed for this IHSS

6.4 IHSS 180

The analytical results for the hot water rinsate samples, alpha and beta smear samples, beta and gamma dose-rate surveys, and beryllium smears for IHSS 180 are provided in Tables 6-8 through 6-11

The results of the four-step radionuclide screening process are presented below

Step 1

No radionuclides detected in the hot water rinsate samples exceeded the permissible radionuclide levels presented in Section 6 1 2

Step 2

None of the post-rinsate smear samples from IHSS 180 exhibited total alpha or beta activity exceeding the permissible U-238 level presented in Section 6 1 2

Step 3

Seven of the sampling areas surveyed for beta dose-rate exceeded the established screening limit of 2 5 mrem/hr Therefore, additional evaluation of radiological exposure was conducted in Step 4 None of the areas exceeded the screening limit for gamma dose-rate

Step 4

Some of the beta dose-rate surveys at IHSS 180 failed the conservative screening criteria established under Step 3 Therefore, the GENII model was used to estimate the whole-body dose expected as a result of occupational exposures in IHSS 180 To provide a conservative analysis, the highest total alpha or beta reading from the post-rinsate smear sampling data (69 dpm/100 cm^2, total beta at sampling area 10 [See Table 6-9 and Figure 3-5]) was used to generate the dust and airborne concentrations for input to the GENII model

The GENII model assumes that the exposed individual receives a radiological dose via incidental ingestion of dust, inhalation of airborne dust, and direct external irradiation The dust concentration used for the ingestion and irradiation pathways was converted from the smear sample concentration using an assumed dust loading of 560 mg/m^2 on surfaces (Hawley, 1985) and 100 $\mu g/m^3$ in air (NRC, 1993) This resulted in a radionuclide concentration in dust of 5 6 x 10^6 pCi/kg The air concentration was estimated at 0 560 pCi/m^3, as described in Section 6 1 2

Since the specific radionuclide inventory comprising the total alpha and beta radiation reading was unknown, the GENII model was run once for each of the six radionuclides detected at OU15 In each GENII run, the total activity was input assuming that it was all attributable to one of the six radionuclides under evaluation The maximum predicted dose from any of the six runs was then used as a basis for evaluating the screening results The results for IHSS 180 were

Radionuclide	Annual Effective Dose Equivalent
Am-241	3 7 rem/yr
Pu-239/240	0 38 rem/yr
Ra-226	0 86 rem/yr
U-233/234	0 17 rem/yr
U-235	0 58 rem/yr
U-238	0 15 rem/yr

The GENII results for an occupational exposure show annual effective dose equivalents below the limit value of 5 rem/yr (1¼ rem/quarter) The GENII assessment was conservative in that the maximum total alpha or beta radiation reading was used, and the worst-case was selected in terms of the radionuclide inventory comprising the total alpha or beta count

6.5 IHSS 204

The analytical results for the hot water rinsate samples and alpha and beta smear samples for IHSS 204 are provided in Tables 6-12 and 6-13

IHSS 204 will remain an operational unit within the Building 447 RCA and will continue to be used for processing radioactive material Therefore, the Work Plan did not include post-rinsate smear sampling or beta and gamma dose-rate surveys for IHSS 204 No radionuclides detected in the hot water rinsate samples from IHSS 204 exceeded the permissible radionuclide levels presented in Section 6 1 2 Since final closure with respect to radiological contamination cannot be addressed at this time because of the

continued operation of the unit, the radiological screening was not carried any further for IHSS 204

6.6 IHSS 211

The analytical results for the hot water rinsate samples, alpha and beta smear samples, and beta and gamma dose-rate surveys for IHSS 211 are provided in Tables 6-14 through 6-16

The results of the four-step radionuclide screening process are presented below

Step 1

No radionuclides detected in the hot water rinsate samples exceeded the permissible radionuclide levels presented in Section 6 1 2

Step 2

None of the post-rinsate smear samples from IHSS 211 exhibited total alpha or beta activity exceeding the permissible radionuclide levels presented in Section 6 1 2

Step 3

None of the areas surveyed for beta and gamma dose-rate in IHSS 211 exceeded the established screening limit of 2 5 mrem/hr

Step 4

Because none of the data collected at IHSS 211 exceeded the screening criteria described in Steps 1 through 3, no GENII analysis was performed for this IHSS

6.7 IHSS 217

The analytical results for the hot water rinsate samples, alpha and beta smear samples, and beta and gamma dose-rate surveys for IHSS 217 are provided in Tables 6-17 through 6-19

The results of the four-step radionuclide screening process are presented below

Step 1

No radionuclides detected in the hot water rinsate samples from IHSS 217 exceeded the permissible radionuclide levels presented in Section 6 1 2

Step 2

None of the post-rinsate smear samples from IHSS 217 exhibited total alpha or beta activity exceeding the permissible radionuclide levels presented in Section 6 1 2

Step 3

None of the areas surveyed for beta and gamma dose-rate in IHSS 217 exceeded the established screening limit of 2 5 mrem/hr

Step 4

Since none of the data collected at IHSS 217 exceeded the screening criteria described in Steps 1 through 3, no GENII analysis was performed for this IHSS

6.8 Summary of CERCLA Evaluation

The CERCLA evaluation for OU15 consisted of comparing radionuclide data to appropriate regulatory criteria and standards, as well as to NRC, DOE, and RFP guidance, and presenting beryllium smear data The radionuclide evaluation is

summarized in Section 6 8 1, and the presence of beryllium in two of the OU15 IHSSs is addressed in Section 6 8 2

6.8.1 Radionuclide Evaluation

Radionuclide results from the hot water rinsate samples, total alpha and beta counts from smear samples, and beta and gamma dose-rate data from dose-rate surveys were compared to radiation standards for workers The standards included maximum permissible airborne radionuclide levels and maximum permissible dose-rate levels for all exposure pathways None of the IHSSs showed radionuclide levels which yielded calculated exceedences of the maximum permissible radionuclide levels in air IHSS 180 showed beta dose-rate survey data which exceeded the initial screening level of 2 5 mrem/hr However, GENII calculations of total dose from specific radionuclides at IHSS 180 showed that the dose-rate standards were not exceeded at IHSS 180

Based on these results, no further investigatory action is proposed for OU15 with respect to radionuclides

6.8.2 Beryllium Contamination

The presence of beryllium surface contamination in excess of the RFP beryllium smear control level of 25 micrograms per square foot (approximately 2 7 micrograms per 100 square centimeters), as established in the RFP Health and Safety Practices HSP 13 04, was detected during smear sampling in IHSSs 179 and 180 However, the pattern of detections and the relative magnitude of the results within and around each of the IHSSs did not indicate that the beryllium surface contamination was attributable to the storage of wastes in the IHSSs A pattern of detections showing higher beryllium levels within the IHSS versus areas around the IHSS would be indicative that the IHSS was the beryllium source Instead the sampling results suggested that the presence of beryllium

may be associated with other operations in the respective buildings The beryllium detections were apparently random in location and magnitude with respect to the IHSS, and did not indicate a higher frequency or magnitude of detections within the IHSS versus outside the IHSS Beryllium may have been commingled with the RCRA-regulated wastes stored in drums in the IHSSs, but was not itself subject to regulation Beryllium is only RCRA-regulated as a discarded or off-specification chemical product that is essentially pure in form Such a waste (e g , beryllium dust) would carry an EPA Code of P015

IHSSs 179 and 180 should be able to proceed with the RCRA closure process despite the presence of beryllium The RCRA clean closure performance standards specified in the RFP State RCRA Permit address only TC metals, which do not include beryllium Furthermore, results from the OU15 Stage I and II field investigations did not indicate that beryllium contamination had migrated from the IHSS locations to outside the buildings Although not a RCRA concern, beryllium contamination in IHSSs 179 and 180 will need to be addressed prior to completing building D&D or economic redevelopment Beryllium contamination will be addressed for ongoing building operations on a building-wide basis in accordance with the requirements of HSP 13 04

Table 6-1
Radionuclides Detected in Hot Water Rinsate Samples
IHSS 178

Building	IHSS	Location	Sample Number	Sample Date	Test Group	Radionuclide	Result (pCi/L)	Error	Qualifier	Detection Limit (pCi/L)	Validation Code	QC Code	QC Partner	Rinsate Volume (L)	Rinsate Area (m^2)	Concentration in Dust* (pCi/g)
881	178	IHSS	BU00011ER	16-Aug 93	DRADS	GROSS ALPHA	7 9	1 2		0 82	V	REAL		15 09	10	2 13e+1
881	178	IHSS	BU00011ER	16-Aug 93	DRADS	GROSS BETA	11	4 0		5 5	V	REAL		15 09	10	2 96e+1
881	178	IHSS	BU00011ER	16-Aug 93	DRADS	PLUTONIUM 239/240	023	0 012	B	0 009	V	REAL		15 09	10	6 20e-2
881	178	IHSS	BU00011ER	16-Aug 93	DRADS	RADIUM 226	37	0 18	BJ	0 26	A	REAL		15 09	10	9 97e-1
881	178	IHSS	BU00011ER	16-Aug 93	DRADS	URANIUM-233 -234	9 3	1 7	B	0 11	A	REAL		15 09	10	2 51e+1
881	178	IHSS	BU00011ER	16-Aug 93	DRADS	URANIUM 235	22	0 20	J	0 036	A	REAL		15 09	10	5 93e 1
881	178	IHSS	BU00011ER	16-Aug 93	DRADS	URANIUM 238	1	0 44	B	0 061	A	REAL		15 09	10	2 69e+0
881	178	IHSS	BU00012ER	16-Aug 93	DRADS	GROSS ALPHA	8 7	1 3		0 69	V	DUP	BU00011ER	15 09	10	2 34e+1
881	178	IHSS	BU00012ER	16-Aug 93	DRADS	GROSS BETA	17	4 1		5 1	V	DUP	BU00011ER	15 09	10	4 58e+1
881	178	IHSS	BU00012ER	16-Aug 93	DRADS	PLUTONIUM-239/240	024	0 012	B	0 007	V	DUP	BU00011ER	15 09	10	6 47e 2
881	178	IHSS	BU00012ER	16-Aug 93	DRADS	RADIUM 226	49	0 14	BJ	0 14	A	DUP	BU00011ER	15 09	10	1 32e+0
881	178	IHSS	BU00012ER	16-Aug 93	DRADS	URANIUM 233 234	9 6	1 8	B	0 037	A	DUP	BU00011ER	15 09	10	2 59e+1
881	178	IHSS	BU00012ER	16-Aug 93	DRADS	URANIUM 235	44	0 29	J	0 063	A	DUP	BU00011ER	15 09	10	1 19e+0
881	178	IHSS	BU00012ER	16-Aug 93	DRADS	URANIUM 238	1 2	0 50	B	0 063	A	DUP	BU00011ER	15 09	10	3 23e+0
881	178	Perimeter	BU00014ER	16-Aug 93	DRADS	GROSS ALPHA	5 2	0 79		0 47	V	REAL		11 73	6	1 82e+1
881	178	Perimeter	BU00014ER	16-Aug 93	DRADS	GROSS BETA	10	2 9		3 9	V	REAL		11 73	6	3 49e+1
881	178	Perimeter	BU00014ER	16-Aug 93	DRADS	PLUTONIUM 239/240	02	0 010	B	0 005	V	REAL		11 73	6	6 98e 2
881	178	Perimeter	BU00014ER	16-Aug 93	DRADS	RADIUM 226	47	0 20	BJ	0 27	A	REAL		11 73	6	1 64e+0
881	178	Perimeter	BU00014ER	16-Aug 93	DRADS	URANIUM 233 234	5 5	1 2	B	0 035	A	REAL		11 73	6	1 92e+1
881	178	Perimeter	BU00014ER	16-Aug 93	DRADS	URANIUM 235	21	0 19	J	0 060	A	REAL		11 73	6	7 33e 1
881	178	Perimeter	BU00014ER	16 Aug 93	DRADS	URANIUM 238	81	0 38	B	0 035	A	REAL		11 73	6	2 83e+0
881	178	Pathway	BU00015ER	16-Aug 93	DRADS	AMERICIUM 241	019	0 010		0 002	V	REAL		13 29	8 8	5 12e 2
881	178	Pathway	BU00015ER	16-Aug 93	DRADS	GROSS ALPHA	28	2 2		0 83	V	REAL		13 29	8 8	7 55e+1
881	178	Pathway	BU00015ER	16-Aug 93	DRADS	GROSS BETA	21	4 4		5 4	V	REAL		13 29	8 8	5 66e+1
881	178	Pathway	BU00015ER	16 Aug 93	DRADS	PLUTONIUM 239/240	046	0 016		0 008	V	REAL		13 29	8 8	1 24e 1
881	178	Pathway	BU00015ER	16 Aug 93	DRADS	RADIUM 226	45	0 19	BJ	0 27	A	REAL		13 29	8 8	1 21e+0
881	178	Pathway	BU00015ER	16-Aug 93	DRADS	URANIUM 233 234	26	3 6	B	0 058	A	REAL		13 29	8 8	7 01e+1
881	178	Pathway	BU00015ER	16-Aug 93	DRADS	URANIUM 235	98	0 42		0 058	A	REAL		13 29	8 8	2 64e+0
881	178	Pathway	BU00015ER	16 Aug 93	DRADS	URANIUM 238	94	0 41	B	0 058	A	REAL		13 29	8 8	2 54e+0

* Calculated assuming 560 mg of dust per square meter

Table 6-2
Smear Sample Results
IHSS 178

Building	Room	IHSS	Area	Pre-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Pre-Rinsate Smear Sample Beta (dpm/100 cm^2)	Pre-Rinsate Dust Concentration * Alpha (pCi/g)	Pre-Rinsate Dust Concentration * Beta (pCi/g)	Post-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Post-Rinsate Smear Sample Beta (dpm/100 cm^2)	Post-Rinsate Dust Concentration * Alpha (pCi/g)	Post-Rinsate Dust Concentration * Beta (pCi/g)
881	165	178	1	3	0	2 4e+2	0 0e+0	0	18	0 0e+0	1 4e+3
881	165	178	2	0	0	0 0e+0	0 0e+0	0	0	0 0e+0	0 0e+0
881	165	178	3	0	18	0 0e+0	1 4e+3	0	3	0 0e+0	2 4e+2
881	165	178	4	0	3	0 0e+0	2 4e+2	0	9	0 0e+0	7 2e+2
881	165	178	5	3	0	2 4e+2	0 0e+0	3	0	2 4e+2	0 0e+0
881	165	178	6	9	0	7 2e+2	0 0e+0	3	0	2 4e+2	0 0e+0
881	165	178	7	0	12	0 0e+0	9 7e+2	3	15	2 4e+2	1 2e+3
881	165	178	8	0	24	0 0e+0	1 9e+3	9	9	7 2e+2	7 2e+2
881	165	178	9	3	0	2 4e+2	0 0e+0	0	21	0 0e+0	1 7e+3
881	165	178	10	9	9	7 2e+2	7 2e+2	0	0	0 0e+0	0 0e+0
881	165	178	11	0	0	0 0e+0	0 0e+0	3	0	2 4e+2	0 0e+0
881	165	178	12	0	30	0 0e+0	2 4e+3	3	3	2 4e+2	2 4e+2
881	165	178	13	0	0	0 0e+0	0 0e+0	0	27	0 0e+0	2 2e+3
881	165	178	14	0	15	0 0e+0	1 2e+3	0	40	0 0e+0	3 2e+3
881	165	178	15	0	3	0 0e+0	2 4e+2	3	0	2 4e+2	0 0e+0
881	165	178	16	6	0	4 8e+2	0 0e+0	0	6	0 0e+0	4 8e+2
881	165	178	17	0	0	0 0e+0	0 0e+0	9	33	7 2e+2	2 7e+3
881	165	178	18	0	9	0 0e+0	7 2e+2	6	18	4 8e+2	1 4e+3
881	165	178	19	3	0	2 4e+2	0 0e+0	0	0	0 0e+0	0 0e+0
881	165	178	20	3	6	2 4e+2	4 8e+2	6	0	4 8e+2	0 0e+0
881	165	178	21	0	0	0 0e+0	0 0e+0	0	0	0 0e+0	0 0e+0
881	165	178	22	0	0	0 0e+0	0 0e+0	0	0	0 0e+0	0 0e+0
881	165	178	23	3	3	2 4e+2	2 4e+2	0	27	0 0e+0	2 2e+3
881	165	178	24	0	9	0 0e+0	7 2e+2	0	30	0 0e+0	2 4e+3
881	165	178	25	0	6	0 0e+0	4 8e+2	0	0	0 0e+0	0 0e+0
881	165	178	26	6	0	4 8e+2	0 0e+0	0	36	0 0e+0	2 9e+3
881	165	178	27	3	0	2 4e+2	0 0e+0	6	0	4 8e+2	0 0e+0
881	165	178	28	3	6	2 4e+2	4 8e+2	0	0	0 0e+0	0 0e+0
881	165	178	29	0	18	0 0e+0	1 4e+3	0	0	0 0e+0	0 0e+0
881	165	178	30	0	0	0 0e+0	0 0e+0	0	39	0 0e+0	3 1e+3

* Calculated assuming 560 mg dust per square meter

Table 6-3
Beta and Gamma Dose-Rate Survey Data
IHSS 178

Building	*Room*	*IHSS*	*Area*	*Gamma Dose-Rate (mrem/hr)*	*Beta Dose-Rate (mrem/hr)*
881	165	178	1	0	0
881	165	178	2	0	0
881	165	178	3	0	0
881	165	178	4	0	0
881	165	178	5	0	0
881	165	178	6	0	0
881	165	178	7	0	0
881	165	178	8	0	0
881	165	178	9	0	0
881	165	178	10	0	0
881	165	178	11	0	0
881	165	178	12	0	0
881	165	178	13	0	0
881	165	178	14	0	0
881	165	178	15	0	0
881	165	178	16	0	0
881	165	178	17	0	0 4
881	165	178	18	0	0 4
881	165	178	19	0	0 4
881	165	178	20	0	0 4
881	165	178	21	0	0 4
881	165	178	22	0	0 4
881	165	178	23	0	0 4
881	165	178	24	0	0 4
881	165	178	25	0	0 4
881	165	178	26	0	0 4
881	165	178	27	0	0 4
881	165	178	28	0	0 4
881	165	178	29	0	0 4
881	165	178	30	0	0 4

Table 6-4
Radionuclides Detected in Hot Water Rinsate Samples
IHSS 179

Building	IHSS	Location	Sample Number	Sample Date	Test Group	Radionuclide	Result (pCi/L)	Error	Qualifier	Detection Limit (pCi/L)	Validation Code	QC Code	QC Partner	Rinsate Volume (L)	Rinsate Area (m^2)	Concentration in Dust* (pCi/g)
865	179	Perimeter	BU00033ER	15 Sep-93	DRADS	AMERICIUM 241	0 007	0 004	J	0 001	V	REAL		15 91	7	2 84e-2
865	179	Perimeter	BU00033ER	15 Sep-93	DRADS	GROSS ALPHA	18	1 3		0 51	V	REAL		15 91	7	7 31e+1
865	179	Perimeter	BU00033ER	15 Sep-93	DRADS	GROSS BETA	27	2 8		2 5	V	REAL		15 91	7	1 10e+2
865	179	Perimeter	BU00033ER	15 Sep 93	DRADS	PLUTONIUM 239/240	0 005	0 004	J	0 005	V	REAL		15 91	7	2 03e-2
865	179	Perimeter	BU00033ER	15 Sep-93	DRADS	RADIUM 226	86	0 050	B	0 040	A	REAL		15 91	7	3 49e+0
865	179	Perimeter	BU00033ER	15 Sep-93	DRADS	URANIUM 233 234	3 0	0 79	B	0 12	A	REAL		15 91	7	1 22e+1
865	179	Perimeter	BU00033ER	15 Sep-93	DRADS	URANIUM 235	0 17	0 17	BJ	0 035	A	REAL		15 91	7	6 90e 1
865	179	Perimeter	BU00033ER	15 Sep-93	DRADS	URANIUM 238	19	2 9	B	0 062	A	REAL		15 91	7	7 71e+1
865	179	Perimeter	BU00034ER	15 Sep-93	DRADS	AMERICIUM 241	0 007	0 004	J	0 001	V	DUP	BU00033ER	15 91	7	2 84e 2
865	179	Perimeter	BU00034ER	15 Sep-93	DRADS	GROSS ALPHA	17	1 2		0 56	V	DUP	BU00033ER	15 91	7	6 90e+1
865	179	Perimeter	BU00034ER	15 Sep-93	DRADS	GROSS BETA	25	2 7		2 3	V	DUP	BU00033ER	15 91	7	1 01e+2
865	179	Perimeter	BU00034ER	15 Sep-93	DRADS	PLUTONIUM 239/240	0 015	0 008		0 007	V	DUP	BU00033ER	15 91	7	6 09e 2
865	179	Perimeter	BU00034ER	15 Sep-93	DRADS	RADIUM 226	66	0 050	B	0 070	A	DUP	BU00033ER	15 91	7	2 68e+0
865	179	Perimeter	BU00034ER	15 Sep-93	DRADS	URANIUM 233 234	3 3	0 94	B	0 13	A	DUP	BU00033ER	15 91	7	1 34e+1
865	179	Perimeter	BU00034ER	15 Sep-93	DRADS	URANIUM 235	0 31	0 26	BJ	0 043	A	DUP	BU00033ER	15 91	7	1 26e+0
865	179	Perimeter	BU00034ER	15 Sep-93	DRADS	URANIUM 238	16	2 8	B	0 15	A	DUP	BU00033ER	15 91	7	6 49e+1
865	179	IHSS	BU00036ER	15 Sep-93	DRADS	AMERICIUM 241	0 018	0 008		0 004	V	REAL		9 09	3	9 74e 2
865	179	IHSS	BU00036ER	15 Sep-93	DRADS	GROSS ALPHA	9 0	0 89		0 49	V	REAL		9 09	3	4 87e+1
865	179	IHSS	BU00036ER	15 Sep 93	DRADS	GROSS BETA	13	2 3		2 6	V	REAL		9 09	3	7 03e+1
865	179	IHSS	BU00036ER	15 Sep-93	DRADS	PLUTONIUM 239/240	0 014	0 008		0 004	V	REAL		9 09	3	7 58e 2
865	179	IHSS	BU00036ER	15 Sep 93	DRADS	URANIUM 233 234	1 9	0 68	B	0 13	A	REAL		9 09	3	1 03e+1
865	179	IHSS	BU00036ER	15 Sep 93	DRADS	URANIUM 235	0 10	0 15	BJ	0 043	A	REAL		9 09	3	5 41e 1
865	179	IHSS	BU00036ER	15 Sep-93	DRADS	URANIUM 238	9 2	1 8	B	0 043	A	REAL		9 09	3	4 98e+1
865	179	Pathway	BU00037ER	15 Sep-93	DRADS	GROSS ALPHA	120	4 1		0 64	V	REAL		9 52	13 3	1 53e+2
865	179	Pathway	BU00037ER	15 Sep-93	DRADS	GROSS BETA	130	6 9		4 1	V	REAL		9 52	13 3	1 66e+2
865	179	Pathway	BU00037ER	15 Sep-93	DRADS	PLUTONIUM 239/240	0 006	0 006	J	0 006	V	REAL		9 52	13 3	7 67e 3
865	179	Pathway	BU00037ER	15 Sep-93	DRADS	RADIUM 226	67	0 050	B	0 070	A	REAL		9 52	13 3	8 56e 1
865	179	Pathway	BU00037ER	15 Sep-93	DRADS	URANIUM 233 234	18	2 8	B	0 037	A	REAL		9 52	13 3	2 30e+1
865	179	Pathway	BU00037ER	15 Sep-93	DRADS	URANIUM 235	2 3	0 69	B	0 037	A	REAL		9 52	13 3	2 94e+0
865	179	Pathway	BU00037ER	15 Sep-93	DRADS	URANIUM 238	130	17	B	0 065	A	REAL		9 52	13 3	1 66e+2

* Calculated assuming 560 mg per square meter

Table 6-5
Smear Sample Results
IHSS 179

Building	Room	IHSS	Area	Pre-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Pre-Rinsate Smear Sample Beta (dpm/100 cm^2)	Pre-Rinsate Dust Concentration* Alpha (pCi/g)	Pre-Rinsate Dust Concentration* Beta (pCi/g)	Post-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Post-Rinsate Smear Sample Beta (dpm/100 cm^2)	Post-Rinsate Dust Concentration* Alpha (pCi/g)	Post-Rinsate Dust Concentration* Beta (pCi/g)
865	145	179	1	12	24	9 7e+2	1 9e+3	15	42	1 2e+3	3 4e+3
865	145	179	2	6	15	4 8e+2	1 2e+3	21	39	1 7e+3	3 1e+3
865	145	179	3	12	12	9 7e+2	9 7e+2	15	27	1 2e+3	2 2e+3
865	145	179	4	9	0	7 2e+2	0 0e+0	12	42	9 7e+2	3 4e+3
865	145	179	5	15	9	1 2e+3	7 2e+2	42	45	3 4e+3	3 6e+3
865	145	179	6	3	15	2 4e+2	1 2e+3	45	36	3 6e+3	2 9e+3
865	145	179	7	9	12	7 2e+2	9 7e+2	21	51	1 7e+3	4 1e+3
865	145	179	8	3	0	2 4e+2	0 0e+0	33	99	2 7e+3	8 0e+3
865	145	179	9	3	9	2 4e+2	7 2e+2	15	36	1 2e+3	2 9e+3
865	145	179	10	12	0	9 7e+2	0 0e+0	27	36	2 2e+3	2 9e+3
865	145	179	11	6	24	4 8e+2	1 9e+3	33	60	2 7e+3	4 8e+3
865	145	179	12	3	0	2 4e+2	0 0e+0	27	54	2 2e+3	4 3e+3
865	145	179	13	12	0	9 7e+2	0 0e+0	69	66	5 6e+3	5 3e+3
865	145	179	14	3	39	2 4e+2	3 1e+3	15	72	1 2e+3	5 8e+3
865	145	179	15	3	18	2 4e+2	1 4e+3	53	69	4 3e+3	5 6e+3
865	145	179	16	9	12	7 2e+2	9 7e+2	21	90	1 7e+3	7 2e+3
865	145	179	17	12	6	9 7e+2	4 8e+2	21	15	1 7e+3	1 2e+3
865	145	179	18	9	0	7 2e+2	0 0e+0	39	72	3 1e+3	5 8e+3
865	145	179	19	9	6	7 2e+2	4 8e+2	39	30	3 1e+3	2 4e+3
865	145	179	20	12	0	9 7e+2	0 0e+0	21	66	1 7e+3	5 3e+3
865	145	179	21	6	42	4 8e+2	3 4e+3	21	69	1 7e+3	5 6e+3
865	145	179	22	6	0	4 8e+2	0 0e+0	39	72	3 1e+3	5 8e+3
865	145	179	23	6	15	4 8e+2	1 2e+3	6	39	4 8e+2	3 1e+3

* Calculated assuming 560 mg dust per square meter

Table 6-6
Beta and Gamma Dose-Rate Survey Data
IHSS 179

Building	*Room*	*IHSS*	*Area*	*Gamma Dose-Rate (mrem/hr)*	*Beta Dose-Rate (mrem/hr)*
865	145	179	1	0	0
865	145	179	2	0	0
865	145	179	3	0	0
865	145	179	4	0	0
865	145	179	5	0	0
865	145	179	6	0	0
865	145	179	7	0	0
865	145	179	8	0 4	0
865	145	179	9	0	1 2
865	145	179	10	0 2	0
865	145	179	11	0	0
865	145	179	12	0	0
865	145	179	13	0	0
865	145	179	14	0	1 6
865	145	179	15	0	0
865	145	179	16	0	0
865	145	179	17	0	0
865	145	179	18	0	0
865	145	179	19	0	0
865	145	179	20	0	0
865	145	179	21	0	0
865	145	179	22	0	0
865	145	179	23	0	0

Table 6-7
Beryllium Smear Data
IHSS 179

uilding	*Room*	*IHSS*	*Area*	*Pre-Rinsate Smear Sample Beryllium (ug/100cm^2)*	*Post-Rinsate Smear Sample Beryllium (ug/100cm^2)*	*Pre-Rinsate Dust Concentration Beryllium* (mg/kg)*	*Post-Rinsate Dust Concentration Beryllium* (mg/kg)*
865	145	179	1	2	0	3 57e+2	
865	145	179	2	0	0		
865	145	179	3	4	1	7 14e+2	1 79e+2
865	145	179	4	0	0		
865	145	179	5	0	0		
865	145	179	6	1	0	1 79e+2	
865	145	179	7	0	4		7 14e+2
865	145	179	8	2	1	3 57e+2	1 79e+2
865	145	179	9	0	0		
865	145	179	10	0	2		3 57e+2
865	145	179	11	4	3	7 14e+2	5 36e+2
865	145	179	12	0	0		
865	145	179	13	1	1	1 79e+2	1 79e+2
865	145	179	14	3	0	5 36e+2	
865	145	179	15	0	0		
865	145	179	16	0	0		
865	145	179	17	1	0	1 79e+2	
865	145	179	18	0	0		
865	145	179	19	4	2	7 14e+2	3 57e+2
865	145	179	20	0	0		
865	145	179	21	0	0		
865	145	179	22	0	1		1 79e+2
865	145	179	23	not counted	0		

* Values calculated assuming 560 mg dust per square meter

Table 6-8
Radionuclides Detected in Hot Water Rinsate Samples
IHSS 180

Building	IHSS	Location	Sample Number	Sample Date	Test Group	Chemical	Result (pCi/L)	Error	Qualifier	Detection Limit (pCi/L)	Validation Code	QC Code	QC Partner	Rinsate Volume (L)	Rinsate Area (m^2)	Concentration in Dust[a] (pCi/g)
883	180	IHSS	BU00023ER	01 Sep-93	DRADS	AMERICIUM 241	0 008	0 006	J	0 002	V	REAL		19 81	7 8	3 63e-2
883	180	IHSS	BU00023ER	01 Sep-93	DRADS	GROSS ALPHA	50	1 9		0 34	V	REAL		19 81	7 8	2 27e+2
883	180	IHSS	BU00023ER	01 Sep-93	DRADS	GROSS BETA	55	3 7		2 6	V	REAL		19 81	7 8	2 49e+2
883	180	IHSS	BU00023ER	01 Sep-93	DRADS	PLUTONIUM 239/240	0 005	0 006	J	0 004	V	REAL		19 81	7 8	2 27e 2
883	180	IHSS	BU00023ER	01 Sep 93	DRADS	RADIUM 226	57	0 080	B	0 11	A	REAL		19 81	7 8	2 59e+0
883	180	IHSS	BU00023ER	01 Sep-93	DRADS	URANIUM 233 234	12	1 9	B	0 056	A	REAL		19 81	7 8	5 44e+1
883	180	IHSS	BU00023ER	01 Sep-93	DRADS	URANIUM 235	0 30	0 22	BJ	0 031	A	REAL		19 81	7 8	1 36e+0
883	180	IHSS	BU00023ER	01 Sep-93	DRADS	URANIUM 238	58	7 3	B	0 031	A	REAL		19 81	7 8	2 63e+2
883	180	IHSS	BU00024ER	01 Sep 93	DRADS	GROSS ALPHA	50	1 9		0 42	V	DUP	BU00023ER	19 81	7 8	2 27e+2
883	180	IHSS	BU00024ER	01 Sep-93	DRADS	GROSS BETA	68	4 0		2 5	V	DUP	BU00023ER	19 81	7 8	3 08e+2
883	180	IHSS	BU00024ER	01 Sep-93	DRADS	PLUTONIUM 239/240	0 007	0 006	J	0 002	V	DUP	BU00023ER	19 81	7 8	3 17e 2
883	180	IHSS	BU00024ER	01 Sep-93	DRADS	RADIUM 226	28	0 080	BJ	0 12	A	DUP	BU00023ER	19 81	7 8	1 27e+0
883	180	IHSS	BU00024ER	01 Sep 93	DRADS	URANIUM 233 234	11	2 2	B	0 13	A	DUP	BU00023ER	19 81	7 8	4 99e+1
883	180	IHSS	BU00024ER	01 Sep-93	DRADS	URANIUM 235	1 2	0 53		0 13	A	DUP	BU00023ER	19 81	7 8	5 44e+0
883	180	IHSS	BU00024ER	01 Sep 93	DRADS	URANIUM 238	67	9 5	B	0 076	A	DUP	BU00023ER	19 81	7 8	3 04e+2
883	180	Perimeter	BU00026ER	01 Sep 93	DRADS	AMERICIUM 241	0 007	0 006	J	0 002	V	REAL		13 76	12 2	1 41e 2
883	180	Perimeter	BU00026ER	01 Sep 93	DRADS	GROSS ALPHA	270	4 8		0 58	V	REAL		13 76	12 2	5 44e+2
883	180	Perimeter	BU00026ER	01 Sep-93	DRADS	GROSS BETA	300	8 1		2 7	V	REAL		13 76	12 2	6 04e+2
883	180	Perimeter	BU00026ER	01 Sep 93	DRADS	PLUTONIUM 239/240	0 007	0 006	J	0 006	V	REAL		13 76	12 2	1 41e 2
883	180	Perimeter	BU00026ER	01 Sep 93	DRADS	RADIUM 226	4	0 060	BJ	0 060	A	REAL		13 76	12 2	8 06e 1
883	180	Perimeter	BU00026ER	01 Sep 93	DRADS	URANIUM 233 234	60	9 1	B	0 087	A	REAL		13 76	12 2	1 21e+2
883	180	Perimeter	BU00026ER	01 Sep 93	DRADS	URANIUM 235	9 7	2 0		0 087	A	REAL		13 76	12 2	1 95e+1
883	180	Perimeter	BU00026ER	01 Sep 93	DRADS	URANIUM 238	380	54	B	0 049	A	REAL		13 76	12 2	7 65e+2
883	180	Pathway	BU00027ER	02 Sep 93	DRADS	GROSS ALPHA	150	3 5		0 41	V	REAL		21 3	12 7	4 49e+2
883	180	Pathway	BU00027ER	02 Sep 93	DRADS	GROSS BETA	180	6 4		3 0	V	REAL		21 3	12 7	5 39e+2
883	180	Pathway	BU00027ER	02 Sep 93	DRADS	PLUTONIUM 239/240	0 006	0 004	J	0 004	V	REAL		21 3	12 7	1 80e 2
883	180	Pathway	BU00027ER	02 Sep 93	DRADS	RADIUM 226	46	0 11	BJ	0 15	A	REAL		21 3	12 7	1 38e+0
883	180	Pathway	BU00027ER	02 Sep-93	DRADS	URANIUM 233 234	37	5 3	B	0 14	A	REAL		21 3	12 7	1 11e+2
883	180	Pathway	BU00027ER	02 Sep 93	DRADS	URANIUM 235	4 4	1 1		0 12	A	REAL		21 3	12 7	1 32e+1
883	180	Pathway	BU00027ER	02 Sep 93	DRADS	URANIUM 238	220	28	B	0 15	A	REAL		21 3	12 7	6 59e+2
883	180	Pathway	BU00028ER	02 Sep-93	DRADS	AMERICIUM 241	0 004	0 004	J	0 001	V	DUP	BU00027ER	21 3	12 7	1 20e 2
883	180	Pathway	BU00028ER	02 Sep 93	DRADS	GROSS ALPHA	190	4 0		0 36	V	DUP	BU00027ER	21 3	12 7	5 69e+2
883	180	Pathway	BU00028ER	02 Sep 93	DRADS	GROSS BETA	180	6 3		2 8	V	DUP	BU00027ER	21 3	12 7	5 39e+2
883	180	Pathway	BU00028ER	02 Sep-93	DRADS	PLUTONIUM 239/240	0 007	0 004	J	0 001	V	DUP	BU00027ER	21 3	12 7	2 10e-2
883	180	Pathway	BU00028ER	02 Sep-93	DRADS	RADIUM 226	51	0 10	B	0 13	A	DUP	BU00027ER	21 3	12 7	1 53e+0
883	180	Pathway	BU00028ER	02 Sep 93	DRADS	URANIUM 233 234	40	5 9	B	0 075	A	DUP	BU00027ER	21 3	12 7	1 20e+2
883	180	Pathway	BU00028ER	02 Sep-93	DRADS	URANIUM 235	4 5	1 1	B	0 042	A	DUP	BU00027ER	21 3	12 7	1 35e+1
883	180	Pathway	BU00028ER	02 Sep 93	DRADS	URANIUM 238	250	33	B	0 042	A	DUP	BU00027ER	21 3	12 7	7 49e+2

Table 6-8
Radionuclides Detected in Hot Water Rinsate Samples
IHSS 180

Building	IHSS	Location	Sample Number	Sample Date	Test Group	Chemical	Result (pCi/L)	Error	Qualifier	Detection Limit (pCi/L)	Validation Code	QC Code	QC Partner	Rinsate Volume (L)	Rinsate Area (m^2)	Concentration in Dust* (pCi/g)
883	180	Pathway	BU00030ER	02 Sep-93	DRADS	AMERICIUM 241	0 006	0 004	J	0 002	V	REAL		12 87	13 9	9 92e-3
883	180	Pathway	BU00030ER	02 Sep-93	DRADS	GROSS ALPHA	100	3 1		0 59	V	REAL		12 87	13 9	1 65e+2
883	180	Pathway	BU00030ER	02 Sep-93	DRADS	GROSS BETA	140	5 6		2 7	V	REAL		12 87	13 9	2 31e+2
883	180	Pathway	BU00030ER	02 Sep 93	DRADS	PLUTONIUM 239/240	0 004	0 004	J	0 001	V	REAL		12 87	13 9	6 61e 3
883	180	Pathway	BU00030ER	02 Sep 93	DRADS	RADIUM 226	28	0 070	BJ	0 10	A	REAL		12 87	13 9	4 63e 1
883	180	Pathway	BU00030ER	02 Sep-93	DRADS	URANIUM 233 -234	21	3 1	B	0 034	A	REAL		12 87	13 9	3 47e+1
883	180	Pathway	BU00030ER	02 Sep-93	DRADS	URANIUM-235	1 3	0 48	B	0 034	A	REAL		12 87	13 9	2 15e+0
883	180	Pathway	BU00030ER	02 Sep 93	DRADS	URANIUM 238	110	14	B	0 060	A	REAL		12 87	13 9	1 82e+2

* Calculated assuming 560 mg of dust per square meter

Table 6-9
Smear Sample Results
IHSS 180

Building	Room	IHSS	Area	Pre-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Pre-Rinsate Smear Sample Beta (dpm/100 cm^2)	Pre-Rinsate Dust Concentration* Alpha (pCi/g)	Pre-Rinsate Dust Concentration* Beta (pCi/g)	Post-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Post-Rinsate Smear Sample Beta (dpm/100 cm^2)	Post-Rinsate Dust Concentration* Alpha (pCi/g)	Post-Rinsate Dust Concentration* Beta (pCi/g)
883	104	180	1	6	0	4 8e+2	0 0e+0	9	0	7 2e+2	0 0e+0
883	104	180	2	9	18	7 2e+2	1 4e+3	6	0	4 8e+2	0 0e+0
883	104	180	3	15	0	1 2e+3	0 0e+0	12	0	9 7e+2	0 0e+0
883	104	180	4	6	0	4 8e+2	0 0e+0	6	9	4 8e+2	7 2e+2
883	104	180	5	12	0	9 7e+2	0 0e+0	21	30	1 7e+3	2 4e+3
883	104	180	6	15	15	1 2e+3	1 2e+3	6	24	4 8e+2	1 9e+3
883	104	180	7	15	0	1 2e+3	0 0e+0	18	21	1 4e+3	1 7e+3
883	104	180	8	9	24	7 2e+2	1 9e+3	6	24	4 8e+2	1 9e+3
883	104	180	9	9	21	7 2e+2	1 7e+3	12	21	9 7e+2	1 7e+3
883	104	180	10	6	27	4 8e+2	2 2e+3	9	69	7 2e+2	5 6e+3
883	104	180	11	6	0	4 8e+2	0 0e+0	6	0	4 8e+2	0 0e+0
883	104	180	12	15	30	1 2e+3	2 4e+3	6	36	4 8e+2	2 9e+3
883	104	180	13	15	45	1 2e+3	3 6e+3	30	6	2 4e+3	4 8e+2
883	104	180	14	12	21	9 7e+2	1 7e+3	3	24	2 4e+2	1 9e+3
883	104	180	15	15	18	1 2e+3	1 4e+3	9	12	7 2e+2	9 7e+2
883	104	180	16	6	0	4 8e+2	0 0e+0	3	18	2 4e+2	1 4e+3
883	104	180	17	9	12	7 2e+2	9 7e+2	18	12	1 4e+3	9 7e+2
883	104	180	18	9	0	7 2e+2	0 0e+0	9	15	7 2e+2	1 2e+3
883	104	180	19	15	9	1 2e+3	7 2e+2	18	9	1 4e+3	7 2e+2
883	104	180	20	6	9	4 8e+2	7 2e+2	3	30	2 4e+2	2 4e+3
883	104	180	21	6	18	4 8e+2	1 4e+3	9	0	7 2e+2	0 0e+0
883	104	180	22	3	57	2 4e+2	4 6e+3	12	24	9 7e+2	1 9e+3
883	104	180	23	0	0	0 0e+0	0 0e+0	9	48	7 2e+2	3 9e+3
883	104	180	24	3	0	2 4e+2	0 0e+0	18	0	1 4e+3	0 0e+0
883	104	180	25	9	12	7 2e+2	9 7e+2	12	0	9 7e+2	0 0e+0
883	104	180	26	6	0	4 8e+2	0 0e+0	45	3	3 6e+3	2 4e+2
883	104	180	27	18	12	1 4e+3	9 7e+2	21	33	1 7e+3	2 7e+3
883	104	180	28	9	18	7 2e+2	1 4e+3	21	6	1 7e+3	4 8e+2
883	104	180	29	3	27	2 4e+2	2 2e+3	9	36	7 2e+2	2 9e+3
883	104	180	30	6	39	4 8e+2	3 1e+3	15	39	1 2e+3	3 1e+3
883	104	180	31	6	0	4 8e+2	0 0e+0	21	54	1 7e+3	4 3e+3
883	104	180	32	21	0	1 7e+3	0 0e+0	21	42	1 7e+3	3 4e+3
883	104	180	33	6	0	4 8e+2	0 0e+0	6	57	4 8e+2	4 6e+3
883	104	180	34	6	30	4 8e+2	2 4e+3	21	45	1 7e+3	3 6e+3
883	104	180	35	9	9	7 2e+2	7 2e+2	3	21	2 4e+2	1 7e+3
883	104	180	36	9	3	7 2e+2	2 4e+2	9	6	7 2e+2	4 8e+2
883	104	180	37	0	36	0 0e+0	2 9e+3	0	3	0 0e+0	2 4e+2
883	104	180	38	9	6	7 2e+2	4 8e+2	21	15	1 7e+3	1 2e+3

Table 6-9
Smear Sample Results
IHSS 180

Building	Room	IHSS	Area	Pre-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Pre-Rinsate Smear Sample Beta (dpm/100 cm^2)	Pre-Rinsate Dust Concentration* Alpha (pCi/g)	Pre-Rinsate Dust Concentration* Beta (pCi/g)	Post-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Post-Rinsate Smear Sample Beta (dpm/100 cm^2)	Post-Rinsate Dust Concentration* Alpha (pCi/g)	Post-Rinsate Dust Concentration* Beta (pCi/g)
883	104	180	39	3	0	2 4e+2	0 0e+0	12	21	9 7e+2	1 7e+3
883	104	180	40	21	0	1 7e+3	0 0e+0	3	45	2 4e+2	3 6e+3
883	104	180	41	0	21	0 0e+0	1 7e+3	12	0	9 7e+2	0 0e+0
883	104	180	42	12	0	9 7e+2	0 0e+0	6	0	4 8e+2	0 0e+0
883	104	180	43	0	12	0 0e+0	9 7e+2	12	0	9 7e+2	0 0e+0
883	104	180	44	0	0	0 0e+0	0 0e+0	3	3	2 4e+2	2 4e+2
883	104	180	45	0	0	0 0e+0	0 0e+0	6	0	4 8e+2	0 0e+0
883	104	180	46	0	0	0 0e+0	0 0e+0	9	0	7 2e+2	0 0e+0
883	104	180	47	18	18	1 4e+3	1 4e+3	3	12	2 4e+2	9 7e+2
883	104	180	48	12	12	9 7e+2	9 7e+2	3	0	2 4e+2	0 0e+0
883	104	180	49	6	6	4 8e+2	4 8e+2	6	0	4 8e+2	0 0e+0

* Calculated assuming 560 mg of dust per square meter

Table 6-10
Beta and Gamma Dose-Rate Survey Data
IHSS 180

Building	*Room*	*IHSS*	*Area*	*Gamma Dose-Rate (mrem/hr)*	*Beta Dose-Rate (mrem/hr)*
883	104	180	1	0 1	0
883	104	180	2	0	0 4
883	104	180	3	0	0 4
883	104	180	4	0	0
883	104	180	5	0 1	1 2
883	104	180	6	0	0 4
883	104	180	7	0 1	0
883	104	180	8	0	0
883	104	180	9	0	0 4
883	104	180	10	0	0 4
883	104	180	11	0	0 4
883	104	180	12	0	0
883	104	180	13	0	0
883	104	180	14	0	0 4
883	104	180	15	0	0 4
883	104	180	16	0	0 4
883	104	180	17	0	0 4
883	104	180	18	0 1	2
883	104	180	19	0	0 8
883	104	180	20	0 1	2
883	104	180	21	0	0 8
883	104	180	22	0 1	0
883	104	180	23	0 5	11 2
883	104	180	24	0	0
883	104	180	25	0	0 8
883	104	180	26	0	0 8
883	104	180	27	0 4	0 4
883	104	180	28	0	0 1
883	104	180	29	0 1	4 4
883	104	180	30	0 3	5 6
883	104	180	31	0 2	3 6
883	104	180	32	0	0 2
883	104	180	33	0 3	2 4
883	104	180	34	0 1	0 8
883	104	180	35	0 1	0 4
883	104	180	36	0	0 4
883	104	180	37	0	0
883	104	180	38	0	0
883	104	180	39	0	0 4
883	104	180	40	0	0
883	104	180	41	0 3	4 4
883	104	180	42	0 1	3 2
883	104	180	43	0 1	2 8
883	104	180	44	0	0 4
883	104	180	45	0	0 4
883	104	180	46	0	0 4
883	104	180	47	0 1	0 4
883	104	180	48	0	1 2
883	104	180	49	0	0 4

Table 6-11
Beryllium Smear Data
IHSS 180

Building	*Room*	*IHSS*	*Area*	*Pre-Rinsate Smear Sample Beryllium (ug/100cm^2)*	*Post-Rinsate Smear Sample Beryllium (ug/100cm^2)*	*Pre-Rinsate Dust Concentration Beryllium* (mg/kg)*	*Post-Rinsate Dust Concentration Beryllium* (mg/kg)*
883	104	180	1	0	1		1 79e+2
883	104	180	2	0	0		
883	104	180	3	0	0		
883	104	180	4	1	0	1 79e+2	
883	104	180	5	3	0	5 36e+2	
883	104	180	6	0	0		
883	104	180	7	0	2		3 57e+2
883	104	180	8	0	0		
883	104	180	9	0	0		
883	104	180	10	1	0	1 79e+2	
883	104	180	11	0	0		
883	104	180	12	0	0		
883	104	180	13	0	0		
883	104	180	14	0	0		
883	104	180	15	0	0		
883	104	180	16	0	0		
883	104	180	17	0	0		
883	104	180	18	0	0		
883	104	180	19	3	0	5 36e+2	
883	104	180	20	1	0	1 79e+2	
883	104	180	21	0	0		
883	104	180	22	0	3		5 36e+2
883	104	180	23	0	0		
883	104	180	24	0	0		
883	104	180	25	4	0	7 14e+2	
883	104	180	26	1	0	1 79e+2	
883	104	180	27	0	0		
883	104	180	28	0	0		
883	104	180	29	0	0		
883	104	180	30	0	0		
883	104	180	31	0	3		5 36e+2
883	104	180	32	0	0		
883	104	180	33	0	23		4 11e+3
883	104	180	34	1	2	1 79e+2	3 57e+2
883	104	180	35	4	8	7 14e+2	1 43e+3
883	104	180	36	0	6		1 07e+3
883	104	180	37	0	0		
883	104	180	38	0	6		1 07e+3
883	104	180	39	0	0		
883	104	180	40	0	0		
883	104	180	41	0	2		3 57e+2
883	104	180	42	0	0		
883	104	180	43	0	0		
883	104	180	44	14	0	2 50e+3	
883	104	180	45	0	0		
883	104	180	46	0	27		4 82e+3
883	104	180	47	0	33		5 89e+3
883	104	180	48	1	14	1 79e+2	2 50e+3
883	104	180	49	0	1		1 79e+2

* Values calculated assuming 560 mg dust per square meter

Table 6-12
Radionuclides Detected in Hot Water Rinsate Samples
IHSS 204

Building	IHSS	Location	Sample Number	Sample Date	Test Group	Radionuclide	Result (pCi/L)	Error	Qualifier	Detection Limit (pCi/L)	Validation Code	QC Code	QC Partner	Rinsate Volume (L)	Rinsate Area (m^2)	Concentration in Dust* (pCi/g)
447	204	Wash Rack	BU00040ER	11-Oct 93	DRADS	GROSS ALPHA	150	80		1	V	REAL		23 9	8 2	7 81e+2
447	204	Wash Rack	BU00040ER	11-Oct 93	DRADS	GROSS BETA	72	36		2	A	REAL		23 9	8 2	3 75e+2
447	204	Wash Rack	BU00040ER	11-Oct 93	DRADS	URANIUM 233 234	24	29		0 5	V	REAL		23 9	8 2	1 25e+2
447	204	Wash Rack	BU00040ER	11 Oct 93	DRADS	URANIUM 235	3 5	0 77		0 2	V	REAL		23 9	8 2	1 82e+1
447	204	Wash Rack	BU00040ER	11 Oct 93	DRADS	URANIUM 238	180	19		0 5	V	REAL		23 9	8 2	9 37e+2
447	204	Wash Rack	BU00041ER	11-Oct 93	DRADS	GROSS ALPHA	140	7 7		1	V	DUP	BU00040ER	23 9	8 2	7 29e+2
447	204	Wash Rack	BU00041ER	11-Oct 93	DRADS	GROSS BETA	78	3 8		2	A	DUP	BU00040ER	23 9	8 2	4 06e+2
447	204	Wash Rack	BU00041ER	11 Oct 93	DRADS	URANIUM 233 234	26	3 1		0 6	V	DUP	BU00040ER	23 9	8 2	1 35e+2
447	204	Wash Rack	BU00041ER	11 Oct 93	DRADS	URANIUM 235	5 3	0 96		0 2	V	DUP	BU00040ER	23 9	8 2	2 76e+1
447	204	Wash Rack	BU00041ER	11 Oct 93	DRADS	URANIUM 238	200	20		0 5	V	DUP	BU00040ER	23 9	8 2	1 04e+3
447	204	Room 501	BU00043ER	11 Oct 93	DRADS	GROSS ALPHA	36	3 9		1	V	REAL		11 27	6	1 21e+2
447	204	Room 501	BU00043ER	11 Oct 93	DRADS	GROSS BETA	35	2 6		2	A	REAL		11 27	6	1 17e+2
447	204	Room 501	BU00043ER	11 Oct 93	DRADS	PLUTONIUM 239/240	0 013	0 011	B	0 01	A	REAL		11 27	6	4 36e-2
447	204	Room 501	BU00043ER	11-Oct 93	DRADS	URANIUM 233 234	4 9	1 2		0 6	V	REAL		11 27	6	1 64e+1
447	204	Room 501	BU00043ER	11 Oct 93	DRADS	URANIUM 235	0 88	0 49		0 5	V	REAL		11 27	6	2 95e+0
447	204	Room 501	BU00043ER	11 Oct 93	DRADS	URANIUM 238	34	5 6		0 5	V	REAL		11 27	6	1 14e+2
447	204	Room 502	BU00044ER	11 Oct 93	DRADS	GROSS ALPHA	520	17		2	V	REAL		12 03	23 5	4 75e+2
447	204	Room 502	BU00044ER	11 Oct 93	DRADS	GROSS BETA	680	10		2	A	REAL		12 03	23 5	6 22e+2
447	204	Room 502	BU00044ER	11 Oct 93	DRADS	PLUTONIUM 239/240	0 016	0 007	B	0 005	A	REAL		12 03	23 5	1 46e-2
447	204	Room 502	BU00044ER	11 Oct 93	DRADS	URANIUM 233 234	110	10		0 6	R	REAL		12 03	23 5	1 01e+2
447	204	Room 502	BU00044ER	11 Oct 93	DRADS	URANIUM 235	8 4	3 2		7	R	REAL		12 03	23 5	7 68e+0
447	204	Room 502	BU00044ER	11 Oct 93	DRADS	URANIUM 238	840	77		0 6	R	REAL		12 03	23 5	7 68e+2
447	204	Room 31	BU00047ER	09 Nov 93	DRADS	GROSS ALPHA	160	9 8		2	Y	REAL		16 75	5 7	8 40e+2
447	204	Room 31	BU00047ER	09 Nov 93	DRADS	GROSS BETA	45	3 1		2	Y	REAL		16 75	5 7	2 36e+2
447	204	Room 31	BU00047ER	09 Nov 93	DRADS	URANIUM 233 234	29	3 2		0 5	Y	REAL		16 75	5 7	1 52e+2
447	204	Room 31	BU00047ER	09 Nov 93	DRADS	URANIUM 235	4 4	0 79		0 2	Y	REAL		16 75	5 7	2 31e+1
447	204	Room 31	BU00047ER	09 Nov 93	DRADS	URANIUM 238	210	20		0 5	Y	REAL		16 75	5 7	1 10e+3
447	204	Room 31	BU00048ER	09 Nov 93	DRADS	GROSS ALPHA	180	11		3	Y	DUP	BU00047ER	16 75	5 7	9 45e+2
447	204	Room 31	BU00048ER	09 Nov 93	DRADS	GROSS BETA	63	3 5		2	Y	DUP	BU00047ER	16 75	5 7	3 31e+2
447	204	Room 31	BU00048ER	09 Nov 93	DRADS	URANIUM 233 234	27	3 2		0 5	Y	DUP	BU00047ER	16 75	5 7	1 42e+2
447	204	Room 31	BU00048ER	09 Nov 93	DRADS	URANIUM 235	4 3	0 80		0 2	Y	DUP	BU00047ER	16 75	5 7	2 26e+1
447	204	Room 31	BU00048ER	09 Nov 93	DRADS	URANIUM 238	210	21	B	0 5	Y	DUP	BU00047ER	16 75	5 7	1 10e+3
447	204	Room 32	BU00050ER	09 Nov 93	DRADS	GROSS ALPHA	6400	61		2	Y	REAL		12 51	27 7	5 16e+3
447	204	Room 32	BU00050ER	09 Nov 93	DRADS	PLUTONIUM 239/240	0 014	0 006		0 006	Y	REAL		12 51	27 7	1 13e-2
447	204	Room 32	BU00050ER	09 Nov 93	DRADS	URANIUM 238	7600	2000		900	Y	REAL		12 51	27 7	6 13e+3

* Calculated assuming 560 mg of dust per square meter

Table 6-13
Smear Sample Results
IHSS 204

Building	Room	IHSS	Area	Pre-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Pre-Rinsate Smear Sample Beta (dpm/100 cm^2)	Pre-Rinsate Dust Concentration* Alpha (pCi/g)	Pre-Rinsate Dust Concentration* Beta (pCi/g)	Post-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Post-Rinsate Smear Sample Beta (dpm/100 cm^2)	Post-Rinsate Dust Concentration* Alpha (pCi/g)	Post-Rinsate Dust Concentration* Beta (pCi/g)
447	31	204	1	24	0	1 9e+3	0 0e+0	Post-Rinsate Smear Samples not collected for IHSS 204			
447	31	204	2	12	6	9 7e+2	4 8e+2				
447	31	204	3	6	0	4 8e+2	0 0e+0				
447	31	204	4	30	0	2 4e+3	0 0e+0				
447	31	204	5	15	33	1 2e+3	2 7e+3				
447	31	204	6	12	9	9 7e+2	7 2e+2				
447	32	204	7	2600	13252	2 1e+5	1 1e+6				
447	32	204	8	2000	11363	1 6e+5	9 1e+5				
447	32	204	9	2400	18939	1 9e+5	1 5e+6				
447	32	204	10	2000	14204	1 6e+5	1 1e+6				
447	32	204	11	3200	28409	2 6e+5	2 3e+6				
447	32	204	12	5000	37878	4 0e+5	3 0e+6				
447	32	204	13	2200	12310	1 8e+5	9 9e+5				
447	32	204	14	3000	16098	2 4e+5	1 3e+6				
447	32	204	15	2600	12310	2 1e+5	9 9e+5				
447	32	204	16	4000	28409	3 2e+5	2 3e+6				
447	32	204	17	4000	23674	3 2e+5	1 9e+6				
447	32	204	18	14000	132575	1 1e+6	1 1e+7				
447	32	204	19	6000	57878	4 8e+5	4 7e+6				
447	32	204	20	11000	71522	8 8e+5	5 8e+6				
447	32	204	21	6000	56818	4 8e+5	4 6e+6				
447	32	204	22	6000	28409	4 8e+5	2 3e+6				
447	32	204	23	8000	47348	6 4e+5	3 8e+6				
447	32	204	24	12000	151515	9 7e+5	1 2e+7				
447	32	204	25	1600	12310	1 3e+5	9 9e+5				
447	32	204	26	4000	18939	3 2e+5	1 5e+6				
447	32	204	27	3000	12310	2 4e+5	9 9e+5				
447	32	204	28	1400	9469	1 1e+5	7 6e+5				
447	32	204	29	12000	104166	9 7e+5	8 4e+6				
447	32	204	30	3000	16099	2 4e+5	1 3e+6				
447	32	204	31	6000	66290	4 8e+5	5 3e+6				
447	32	204	32	5000	66290	4 0e+5	5 3e+6				
447	32	204	33	8000	47350	6 4e+5	3 8e+6				
447	32	204	34	10000	66290	8 0e+5	5 3e+6				
447	501	204	1	0	0	0 0e+0	0 0e+0				
447	501	204	2	12	3	9 7e+2	2 4e+2				
447	501	204	3	15	0	1 2e+3	0 0e+0				
447	501	204	4	30	0	2 4e+3	0 0e+0				
447	501	204	5	6	60	4 8e+2	4 8e+3				
447	501	204	6	12	0	9 7e+2	0 0e+0				

Table 6-13
Smear Sample Results
IHSS 204

Building	Room	IHSS	Area	Pre-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Pre-Rinsate Smear Sample Beta (dpm/100 cm^2)	Pre-Rinsate Dust Concentration* Alpha (pCi/g)	Pre-Rinsate Dust Concentration* Beta (pCi/g)	Post-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Post-Rinsate Smear Sample Beta (dpm/100 cm^2)	Post-Rinsate Dust Concentration* Alpha (pCi/g)	Post-Rinsate Dust Concentration* Beta (pCi/g)
447	502	204	7	102	114	8 2e+3	9 2e+3				
447	502	204	8	132	168	1 1e+4	1 4e+4				
447	502	204	9	99	162	8 0e+3	1 3e+4				
447	502	204	10	222	243	1 8e+4	2 0e+4				
447	502	204	11	129	219	1 0e+4	1 8e+4				
447	502	204	12	153	222	1 2e+4	1 8e+4				
447	502	204	13	174	279	1 4e+4	2 2e+4				
447	502	204	14	123	156	9 9e+3	1 3e+4				
447	502	204	15	198	213	1 6e+4	1 7e+4				
447	502	204	16	1359	3834	1 1e+5	3 1e+5				
447	502	204	17	336	588	2 7e+4	4 7e+4				
447	502	204	18	294	426	2 4e+4	3 4e+4				
447	502	204	19	342	576	2 8e+4	4 6e+4				
447	502	204	20	324	594	2 6e+4	4 8e+4				
447	502	204	21	135	285	1 1e+4	2 3e+4				
447	502	204	22	279	372	2 2e+4	3 0e+4				
447	502	204	23	273	504	2 2e+4	4 1e+4				
447	502	204	24	669	1551	5 4e+4	1 2e+5				
447	502	204	25	417	1029	3 4e+4	8 3e+4				
447	502	204	26	243	303	2 0e+4	2 4e+4				
447	502	204	27	708	2331	5 7e+4	1 9e+5				
447	502	204	28	447	927	3 6e+4	7 5e+4				
447	502	204	29	408	636	3 3e+4	5 1e+4				
447	502	204	30	486	711	3 9e+4	5 7e+4				
447	502	204	31	375	768	3 0e+4	6 2e+4				
447	502	204	32	411	588	3 3e+4	4 7e+4				
447	502	204	33	189	339	1 5e+4	2 7e+4				
447	501WR	204	1	129	750	1 0e+4	6 0e+4				
447	501WR	204	2	216	1194	1 7e+4	9 6e+4				
447	501WR	204	3	99	132	8 0e+3	1 1e+4				
447	501WR	204	4	228	807	1 8e+4	6 5e+4				
447	501WR	204	5	42	18	3 4e+3	1 4e+3				
447	501WR	204	6	12	0	9 7e+2	0 0e+0				
447	501WR	204	7	3	0	2 4e+2	0 0e+0				
447	501WR	204	8	3	6	2 4e+2	4 8e+2				
447	501WR	204	9	12	6	9 7e+2	4 8e+2				
447	501WR	204	10	9	not counted	7 2e+2					

* Calculated assuming 560 mg of dust per square meter

Table 6-14
Radionuclides Detected in Hot Water Rinsate Samples
IHSS 211

Building	IHSS	Location	Sample Number	Sample Date	Test Group	Radionuclide	Result (pCi/L)	Error	Qualifier	Detection Limit (pCi/L)	Validation Code	QC Code	QC Partner*	Rinsate Volume (L)	Rinsate Area (m^2)	Concentration in Dust** (pCi/g)
881	211	IHSS	BU00002ER	09 Aug 93	DRADS	AMERICIUM-241	007	0 006	BJ	0 004	V	REAL		10 7	17 8	7 51e 3
881	211	IHSS	BU00002ER	09-Aug 93	DRADS	GROSS ALPHA	7 1	0 93		0 61	V	REAL		10 7	17 8	7 62e+0
881	211	IHSS	BU00002ER	09 Aug 93	DRADS	GROSS BETA	19	2 5		2 6	V	REAL		10 7	17 8	2 04e+1
881	211	IHSS	BU00002ER	09 Aug 93	DRADS	PLUTONIUM 239/240	15	0 024	B	0 003	A	REAL		10 7	17 8	1 61e 1
881	211	IHSS	BU00002ER	09 Aug 93	DRADS	RADIUM 226	65	0 19	B	0 24	A	REAL		10 7	17 8	6 98e-1
881	211	IHSS	BU00003ER	09 Aug 93	DRADS	GROSS ALPHA	7 4	1 0		0 65	V	DUP	BU00002ER	10 7	17 8	7 94e+0
881	211	IHSS	BU00003ER	09 Aug 93	DRADS	GROSS BETA	16	2 4		2 6	V	DUP	BU00002ER	10 7	17 8	1 72e+1
881	211	IHSS	BU00003ER	09 Aug 93	DRADS	RADIUM 226	14	0 070	J	0 10	A	DUP	BU00002ER	10 7	17 8	1 50e 1
881	211	IHSS	BU00003ER	09 Aug 93	DRADS	URANIUM 233 234	6 2	1 7	B	0 069	A	DUP	BU00002ER	10 7	17 8	6 66e+0
881	211	IHSS	BU00003ER	09 Aug-93	DRADS	URANIUM 235	25	0 29	J	0 069	A	DUP	BU00002ER	10 7	17 8	2 68e 1
881	211	IHSS	BU00003ER	09 Aug 93	DRADS	URANIUM 238	65	0 48		0 12	A	DUP	BU00002ER	10 7	17 8	6 98e 1
881	211	Perimeter	BU00006ER	11 Aug 93	DRADS	GROSS ALPHA	1 6	0 41	J	0 37	V	REAL		9 47	3	9 02e+0
881	211	Perimeter	BU00006ER	11 Aug 93	DRADS	GROSS BETA	5 9	2 1		2 9	V	REAL		9 47	3	3 33e+1
881	211	Perimeter	BU00006ER	11 Aug 93	DRADS	PLUTONIUM 239/240	018	0 008	B	0 002	A	REAL		9 47	3	1 01e 1
881	211	Perimeter	BU00006ER	11 Aug 93	DRADS	URANIUM 233 234	1 4	0 56	B	0 11	A	REAL		9 47	3	7 89e+0
881	211	Perimeter	BU00006ER	11 Aug 93	DRADS	URANIUM 235	13	0 17	J	0 11	A	REAL		9 47	3	7 33e 1
881	211	Perimeter	BU00006ER	11 Aug 93	DRADS	URANIUM 238	13	0 17	J	0 11	A	REAL		9 47	3	7 33e 1
881	211	Pathway	BU00008ER	11 Aug 93	DRADS	GROSS ALPHA	4 8	1 4		1 4	V	REAL		15 32	11	1 19e+1
881	211	Pathway	BU00008ER	11 Aug 93	DRADS	GROSS BETA	6 7	2 2		3 0	V	REAL		15 32	11	1 67e+1
881	211	Pathway	BU00008ER	11 Aug 93	DRADS	PLUTONIUM 239/240	02	0 008	B	0 001	A	REAL		15 32	11	4 97e 2
881	211	Pathway	BU00008ER	11 Aug 93	DRADS	URANIUM 233 234	1 5	0 66		0 14	A	REAL		15 32	11	3 73e+0
881	211	Pathway	BU00008ER	11 Aug 93	DRADS	URANIUM 235	19	0 22	J	0 053	A	REAL		15 32	11	4 73e-1
881	211	Pathway	BU00008ER	11 Aug 93	DRADS	URANIUM 238	32	0 29	J	0 053	A	REAL		15 32	11	7 96e 1
881	211	Pathway	BU00009ER	11 Aug 93	DRADS	GROSS ALPHA	2 4	0 54		0 54	V	DUP	BU00008ER	15 32	11	5 97e+0
881	211	Pathway	BU00009ER	11 Aug 93	DRADS	GROSS BETA	8 9	2 1		2 6	V	DUP	BU00008ER	15 32	11	2 21e+1
881	211	Pathway	BU00009ER	11 Aug 93	DRADS	PLUTONIUM 239/240	013	0 006	B	0 003	A	DUP	BU00008ER	15 32	11	3 23e 2
881	211	Pathway	BU00009ER	11 Aug 93	DRADS	URANIUM 233 234	1 3	0 56		0 14	A	DUP	BU00008ER	15 32	11	3 23e+0
881	211	Pathway	BU00009ER	11 Aug 93	DRADS	URANIUM 238	2	0 21	J	0 074	A	DUP	BU00008ER	15 32	11	4 97e 1

* The data for IHSS 211 QC Partner samples was not input into RFEDS but has been manually entered here
** Calculated assuming 560 mg dust per square meter

Table 6-15
Smear Sample Results
IHSS 211

Building	Room	IHSS	Area	Pre-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Pre-Rinsate Smear Sample Beta (dpm/100 cm^2)	Pre-Rinsate Dust Concentration* Alpha (pCi/g)	Pre-Rinsate Dust Concentration* Beta (pCi/g)	Post-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Post-Rinsate Smear Sample Beta (dpm/100 cm^2)	Post-Rinsate Dust Concentration* Alpha (pCi/g)	Post-Rinsate Dust Concentration* Beta (pCi/g)
881	266B	211	1	6	0	4 8e+2	0 0e+0	0	0	0 0e+0	0 0e+0
881	266B	211	2	0	0	0 0e+0	0 0e+0	0	0	0 0e+0	0 0e+0
881	266B	211	3	0	18	0 0e+0	1 4e+3	0	24	0 0e+0	1 9e+3
881	266B	211	4	3	51	2 4e+2	4 1e+3	0	0	0 0e+0	0 0e+0
881	266B	211	5	0	0	0 0e+0	0 0e+0	0	24	0 0e+0	1 9e+3
881	266B	211	6	3	0	2 4e+2	0 0e+0	0	0	0 0e+0	0 0e+0
881	266B	211	7	3	0	2 4e+2	0 0e+0	0	3	0 0e+0	2 4e+2
881	266B	211	8	3	36	2 4e+2	2 9e+3	6	12	4 8e+2	9 7e+2
881	266B	211	9	0	0	0 0e+0	0 0e+0	6	27	4 8e+2	2 2e+3
881	266B	211	10	3	0	2 4e+2	0 0e+0	0	0	0 0e+0	0 0e+0
881	266B	211	11	0	0	0 0e+0	0 0e+0	0	3	0 0e+0	2 4e+2
881	266B	211	12	0	0	0 0e+0	0 0e+0	3	0	2 4e+2	0 0e+0
881	266B	211	13	0	0	0 0e+0	0 0e+0	0	0	0 0e+0	0 0e+0
881	266B	211	14	3	6	2 4e+2	4 8e+2	0	0	0 0e+0	0 0e+0
881	266B	211	15	6	33	4 8e+2	2 7e+3	3	24	2 4e+2	1 9e+3
881	266B	211	16	6	3	4 8e+2	2 4e+2	9	0	7 2e+2	0 0e+0
881	266B	211	17	0	36	0 0e+0	2 9e+3	3	27	2 4e+2	2 2e+3
881	266B	211	18	0	9	0 0e+0	7 2e+2	0	3	0 0e+0	2 4e+2
881	266B	211	19	3	0	2 4e+2	0 0e+0	0	0	0 0e+0	0 0e+0
881	266B	211	20	3	0	2 4e+2	0 0e+0	0	6	0 0e+0	4 8e+2
881	266B	211	21	3	0	2 4e+2	0 0e+0	0	0	0 0e+0	0 0e+0
881	266B	211	22	0	0	0 0e+0	0 0e+0	3	0	2 4e+2	0 0e+0
881	266B	211	23	0	0	0 0e+0	0 0e+0	0	27	0 0e+0	2 2e+3
881	266B	211	24	0	0	0 0e+0	0 0e+0	3	3	2 4e+2	2 4e+2
881	266B	211	25	0	0	0 0e+0	0 0e+0	3	15	2 4e+2	1 2e+3
881	266B	211	26	3	0	2 4e+2	0 0e+0	0	18	0 0e+0	1 4e+3
881	266B	211	27	0	0	0 0e+0	0 0e+0	3	0	2 4e+2	0 0e+0
881	266B	211	28	6	0	4 8e+2	0 0e+0	3	15	2 4e+2	1 2e+3
881	266B	211	29	0	0	0 0e+0	0 0e+0	3	0	2 4e+2	0 0e+0
881	266B	211	30	0	0	0 0e+0	0 0e+0	0	3	0 0e+0	2 4e+2
881	266B	211	31	3	0	2 4e+2	0 0e+0	0	0	0 0e+0	0 0e+0
881	266B	211	32	0	21	0 0e+0	1 7e+3	0	0	0 0e+0	0 0e+0

* Calculated assuming 560 mg of dust per square meter

Table 6-16
Beta and Gamma Dose-Rate Survey Data
IHSS 211

Building	*Room*	*IHSS*	*Area*	*Gamma Dose-Rate (mrem/hr)*	*Beta Dose-Rate (mrem/hr)*
881	266B	211	1	0	0
881	266B	211	2	0	0
881	266B	211	3	0	0
881	266B	211	4	0	0
881	266B	211	5	0	0
881	266B	211	6	0	0
881	266B	211	7	0	0
881	266B	211	8	0	0
881	266B	211	9	0	0
881	266B	211	10	0	0
881	266B	211	11	0	0
881	266B	211	12	0	0
881	266B	211	13	0	0
881	266B	211	14	0	0
881	266B	211	15	0	0
881	266B	211	16	0	0 4
881	266B	211	17	0	0 4
881	266B	211	18	0	0
881	266B	211	19	0	0
881	266B	211	20	0	0
881	266B	211	21	0	0
881	266B	211	22	0	0
881	266B	211	23	0	0
881	266B	211	24	0	0
881	266B	211	25	0	0
881	266B	211	26	0	0
881	266B	211	27	0	0
881	266B	211	28	0	0
881	266B	211	29	0	0
881	266B	211	30	0	0
881	266B	211	31	0	0
881	266B	211	32	0	0

Table 6-17
Radionuclides Detected in Hot Water Rinsate Samples
IHSS 217

Building	IHSS	Location	Sample Number	Sample Date	Test Group	Radionuclide	Result (pCi/L)	Error	Qualifier	Detection Limit (pCi/L)	Validation Code	QC Code	QC Partner	Rinsate Volume (L)	Rinsate Area (m^2)	Concentration in Dust* (pCi/g)
881	217	IHSS	BU00017ER	17 Aug 93	DRADS	AMERICIUM 241	0 21	0 032		0 004	V	REAL		22 97	6 1	1 41e+0
881	217	IHSS	BU00017ER	17 Aug 93	DRADS	GROSS ALPHA	30	1 7		0 40	V	REAL		22 97	6 1	2 02e+2
881	217	IHSS	BU00017ER	17-Aug 93	DRADS	GROSS BETA	20	2 6		2 6	V	REAL		22 97	6 1	1 34e+2
881	217	IHSS	BU00017ER	17 Aug 93	DRADS	PLUTONIUM 239/240	0 037	0 014		0 002	V	REAL		22 97	6 1	2 49e-1
881	217	IHSS	BU00017ER	17 Aug 93	DRADS	RADIUM 226	18	0 040	BJ	0 060	A	REAL		22 97	6 1	1 21e+0
881	217	IHSS	BU00017ER	17 Aug 93	DRADS	URANIUM 233 234	22	3 3		0 13	V	REAL		22 97	6 1	1 48e+2
881	217	IHSS	BU00017ER	17-Aug 93	DRADS	URANIUM 235	0 91	0 43		0 064	V	REAL		22 97	6 1	6 12e+0
881	217	IHSS	BU00017ER	17 Aug 93	DRADS	URANIUM 238	15	2 5		0 064	V	REAL		22 97	6 1	1 01e+2
881	217	IHSS	BU00018ER	17 Aug 93	DRADS	AMERICIUM 241	0 22	0 038		0 005	V	DUP	BU00017ER	22 97	6 1	1 48e+0
881	217	IHSS	BU00018ER	17-Aug 93	DRADS	GROSS ALPHA	41	2 1		0 61	V	DUP	BU00017ER	22 97	6 1	2 76e+2
881	217	IHSS	BU00018ER	17 Aug 93	DRADS	GROSS BETA	26	2 8		2 7	V	DUP	BU00017ER	22 97	6 1	1 75e+2
881	217	IHSS	BU00018ER	17 Aug 93	DRADS	PLUTONIUM 239/240	0 042	0 012		0 005	V	DUP	BU00017ER	22 97	6 1	2 82e 1
881	217	IHSS	BU00018ER	17 Aug 93	DRADS	RADIUM 226	21	0 030	BJ	0 040	A	DUP	BU00017ER	22 97	6 1	1 41e+0
881	217	IHSS	BU00018ER	17 Aug 93	DRADS	URANIUM 233 234	27	3 9		0 091	V	DUP	BU00017ER	22 97	6 1	1 82e+2
881	217	IHSS	BU00018ER	17 Aug 93	DRADS	URANIUM 235	0 90	0 40		0 091	V	DUP	BU00017ER	22 97	6 1	6 05e+0
881	217	IHSS	BU00018ER	17 Aug 93	DRADS	URANIUM 238	17	2 7		0 091	V	DUP	BU00017ER	22 97	6 1	1 14e+2
881	217	Perimeter	BU00020ER	17 Aug 93	DRADS	AMERICIUM 241	0 017	0 008		0 004	V	REAL		14 34	4 6	9 46e 2
881	217	Perimeter	BU00020ER	17 Aug 93	DRADS	GROSS ALPHA	6 9	0 78		0 40	V	REAL		14 34	4 6	3 84e+1
881	217	Perimeter	BU00020ER	17 Aug 93	DRADS	GROSS BETA	15	2 4		2 7	V	REAL		14 34	4 6	8 35e+1
881	217	Perimeter	BU00020ER	17 Aug 93	DRADS	PLUTONIUM 239/240	0 016	0 008		0 002	V	REAL		14 34	4 6	8 91e 2
881	217	Perimeter	BU00020ER	17 Aug 93	DRADS	RADIUM 226	25	0 040	BJ	0 060	A	REAL		14 34	4 6	1 39e+0
881	217	Perimeter	BU00020ER	17 Aug 93	DRADS	URANIUM 233 234	5 6	1 3		0 11	V	REAL		14 34	4 6	3 12e+1
881	217	Perimeter	BU00020ER	17 Aug 93	DRADS	URANIUM 235	0 20	0 20	J	0 042	V	REAL		14 34	4 6	1 11e+0
881	217	Perimeter	BU00020ER	17 Aug 93	DRADS	URANIUM 238	2 3	0 74		0 042	V	REAL		14 34	4 6	1 28e+1

* Calculated assuming 560 mg of dust per square meter

Table 6-18
Smear Sample Results
IHSS 217

Building	Room	IHSS	Area	Pre-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Pre-Rinsate Smear Sample Beta (dpm/100 cm^2)	Pre-Rinsate Dust Concentration* Alpha (pCi/g)	Pre-Rinsate Dust Concentration* Beta (pCi/g)	Post-Rinsate Smear Sample Alpha (dpm/100 cm^2)	Post-Rinsate Smear Sample Beta (dpm/100 cm^2)	Post-Rinsate Dust Concentration* Alpha (pCi/g)	Post-Rinsate Dust Concentration* Beta (pCi/g)
881	131C	217	1	3	0	2 4e+2	0 0e+0	0	3	0 0e+0	2 4e+2
881	131C	217	2	0	12	0 0e+0	9 7e+2	6	0	4 8e+2	0 0e+0
881	131C	217	3	0	18	0 0e+0	1 4e+3	0	12	0 0e+0	9 7e+2
881	131C	217	4	0	30	0 0e+0	2 4e+3	3	0	2 4e+2	0 0e+0
881	131C	217	5	3	18	2 4e+2	1 4e+3	3	9	2 4e+2	7 2e+2
881	131C	217	6	6	0	4 8e+2	0 0e+0	0	30	0 0e+0	2 4e+3
881	131C	217	7	6	39	4 8e+2	3 1e+3	0	9	0 0e+0	7 2e+2
881	131C	217	8	6	3	4 8e+2	2 4e+2	3	30	2 4e+2	2 4e+3
881	131C	217	9	0	0	0 0e+0	0 0e+0	0	9	0 0e+0	7 2e+2
881	131C	217	10	3	27	2 4e+2	2 2e+3	3	33	2 4e+2	2 7e+3
881	131C	217	11	0	24	0 0e+0	1 9e+3	0	6	0 0e+0	4 8e+2
881	131C	217	12	3	36	2 4e+2	2 9e+3	6	24	4 8e+2	1 9e+3
881	131C	217	13	6	24	4 8e+2	1 9e+3	9	3	7 2e+2	2 4e+2

* Calculated assuming 560 mg of dust per square meter

Table 6-19
Beta and Gamma Dose-Rate Survey Data
IHSS 217

Building	*Room*	*IHSS*	*Area*	*Gamma Dose-Rate (mrem/hr)*	*Beta Dose-Rate (mrem/hr)*
881	131C	217	1	0	0 4
881	131C	217	2	0	0 4
881	131C	217	3	0	0 4
881	131C	217	4	0	0 4
881	131C	217	5	0	0 4
881	131C	217	6	0	0 4
881	131C	217	7	0	0 4
881	131C	217	8	0	0 4
881	131C	217	9	0 1	0
881	131C	217	10	0 1	0
881	131C	217	11	0 1	0
881	131C	217	12	0	0
881	131C	217	13	0	0

Section 7.0

7.0 SUMMARY AND CONCLUSIONS

TM#1 presents an evaluation of the data collected during the OU15 Stage I and II field investigations with three specific objectives

1 To determine if Stage III field work would be necessary for any IHSS,

2 To determine if verification sampling would be required to show compliance with the established RCRA closure performance standards for each IHSS, and

3 To determine if any additional CERCLA evaluation would be required with regard to radionuclides and beryllium at any IHSS

This section summarizes the findings of the evaluation of the OU15 IHSSs, and presents specific recommendations for further action

7.1 Summary of Findings

The analyses presented in Sections 2 0, 5 0, and 6 0 included specific determinations for each IHSS of

- whether indoor organic and inorganic compound contamination within each IHSS is at levels low enough to allow for clean closure of the unit under RCRA,
- whether the levels of radiological contamination within each IHSS require additional consideration, and
- whether additional Stage III field work is required to delineate any potential outdoor releases from any of the IHSSs

A summary of the recommendations for each IHSS is provided in Table 7-1

The evaluations of historical information and the visual inspections presented in Section 2 0 indicated that no evidence of releases migrating to outdoor locations existed Therefore, no Stage III field work is anticipated at this time The evaluations of RCRA-

regulated constituents of regulatory concern provided in Section 5 0 showed the presence of detectable levels of cyanide at IHSS 217 Therefore, verification sampling is proposed for IHSS 217 for cyanide All other IHSSs did not show detectable levels of constituents of regulatory concern

The CERCLA evaluations in Section 6 0 indicated that the radionuclide levels detected at all IHSSs were below levels of concern for workers, therefore, no additional action is proposed for radionuclides Two IHSSs, 179 and 180, showed levels of removable beryllium in excess of the RFP beryllium smear control level Sampling data did not indicate the IHSSs as the source of the beryllium, and showed beryllium levels as high or higher outside the IHSS than within it Beryllium decontamination will need to be addressed under the D&D and economic redevelopment programs according to RFP procedures No additional action is proposed as part of the Phase I RFI/RI for OU15 with regard to beryllium

7 2 Recommendations

Verification sampling for cyanide at IHSS 217 is recommended Existing data is sufficient to characterize all other IHSSs, and to complete the Draft Phase I RFI/RI report for OU15 Verification sampling using hot water rinsate collection equipment should proceed immediately using identical equipment and procedures as described in Section 2 0 of this document, and as described in the Work Plan Upon completion of the verification sampling and receipt of the results, the Draft Phase I RFI/RI report should be completed and submitted If verification sampling shows the presence of detectable levels of cyanide at IHSS 217, then a recommendation for decontamination procedures will be required If the verification sampling does not show the presence of cyanide at IHSS 217, then a No Further Action recommendation can be made for all IHSSs

Table 7-1
Decision Summary Matrix

IHSS	Indoor Evaluation		Stage III Field Work
	RCRA (Verification Sampling)	CERCLA (Further Investigation)	
178	NFA	NFA	NFA
179	NFA	NFA	NFA
180	NFA	NFA	NFA
204	NFA	NFA	NFA
211	NFA	NFA	NFA
217	Cyanide	NFA	NFA

NFA = No Further Action

Section 8.0

8.0 SCHEDULE

This section presents the proposed schedule for OU15 activities leading up to the submittal of the Draft Phase I RFI/RI Report At this time, no Stage III field work has been proposed In addition, no further action has been proposed with regard to RCRA clean closure of the indoor units, with the exception of verification sampling for cyanide in IHSS 217 No further investigatory action has been proposed for the six OU15 IHSSs with respect to CERCLA The proposed schedule for concurrence on TM#1, verification sampling of IHSS 217 and the submittal of the Draft Phase I RFI/RI Report is as follows

Submittal of Final Technical Memorandum Number 1	10 May 1994
TM#1 Review Period	11 May 1994 - 24 May 1994
Comment Resolution	25 May 1994 - 2 June 1994
Concurrence on TM#1	3 June 1994
Verification Sampling	10 May 1994 - 24 June 1994
Submittal of Draft Phase I RFI/RI Report	1 August 1994